EJERCICIOS, PROBLEMAS Y DISCUSIONES

SOBRE DIVERSAS PARTES

DE LAS

MATEMATICAS ELEMENTALES.

OBRA ORIGINAL ESCRITA Y DEDICADA

Á

S. A. R. EL SERMO. SEÑOR PRINCIPE DE ASTÚRIAS,

POR

DON MANUEL MARIA BARBE RY,

Comendador de la Real Orden Americana de Isabel la Católica, condecorado con la medalla militar de la guerra de Africa, Director de seccion retirado del Cuerpo de Telégrafos, Miembro de la Sociedad Económica Matritense de Amigos del País, Regente en Matemáticas y antiguo profesor de esta ciencia, Director de caminos vecinales y canales de riego y Maestro de obras de la Academia Nacional de San Fernando.

ÁLGEBRA.

CUADERNO 1º.

MADRID: 1865.
Establecimiento tipográfico de Estrada, Diaz y Lopez.
Hiedra, 5 *y* 7.

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El autor

Manuel Barbery

Á S. A. R. EL SERMO. SR. D. ALFONSO DE BORBON Y BORBON,

PRINCIPE DE ASTURIAS.

SERENISIMO SEÑOR:

Si la gratitud es el más noble y generoso de los sentimientos humanos, debe ser el primero en el corazon del pobre ciego que halló en su Reina, vuestra Augusta Madre, su segunda Providencia cuando se presentó á sus Reales piés para pedir, como consiguió, auxilio en su desgracia y proteccion para sus científicos trabajos. El que tengo el honor de ofrecer hoy á V. A. es el fruto de largos años de estudio y de profesorado: ¡ojalá fuera útil para la esmerada instruccion que V. A. habrá de recibir en su dia dirigido por las sábias personas elegidas por la mejor de las Reinas! Feliz yo si consigo este objeto y puedo, aunque imperfectamente, corresponder á la generosa proteccion que he debido á vuestros Augustos padres. Satisfecha por completo mi ambicion, podré manifestar á mis compatriotas que la privacion de la vista, adquirida en servicio de mi Pátria y de mis Reyes, me permite aun contribuir, siquiera sea indirectamente, á la instruccion del Excelso Príncipe que ha de completar la obra de la regeneracion de España emprendida y muy adelantada por la bondadosa madre de los españoles.

SERENÍSIMO SEÑOR:

Á LOS REALES PIES DE V. A.

Su mas fiel y apasionado súbdito

Manuel María Barbéry y García.

AL LECTOR.

Al presentar al público el tomo correspondiente al Algebra que forma parte de la coleccion completa de *ejercicios de cálculo, problemas y discusiones sobre las matemáticas elementales*, creo conveniente dar una idea aunque ligera de su composicion.

Este tomo se halla dividido en tres libros, de los que el primero contiene 1563 ejemplos de todas las operaciones del Algebra elemental, componiendo la primera parte los datos y la segunda los resultados, dejando al cuidado y estudio del calculador llegar á estos siguiendo las reglas de cada operacion.

El libro segundo comprende los enunciados, planteos y soluciones de gran número de problemas meditados y ordenados convenientemente á fin de vencer de una manera gradual las dificultades crecientes que siempre ofrece esta parte del Algebra elemental.

Finalmente el libro tercero se compone de enunciados, planteos y resoluciones de nuevos problemas sobre las principales cuestiones de Mecánica, Física, Banca y Comercio, con una extensa y razonada discusion de todos aquellos cuya índole lo exija y permita.

Por mucha que sea la indulgencia con que el ilustrado público admita y juzgue esta publica-

cion, no dejará de hallar en ella algunos defectos inherentes á un trabajo único hoy en España, y que si para todos ofrece numerosas dificultades que vencer, estas se multiplican extraordinariamente en las circunstacias del autor, que por consecuencia de nuestra guerra de Africa quedó privado de la vista. Supla pues mi buen deseo lo que falte de mérito en estos ensayos, que si llegan á ser bien recibidos de mis comprofesores y del público en general, dejarán colmadas mis aspiraciones.

Debo consignar aquí mi gratitud hacia mis amigos el jefe de estacion del Cuerpo de Telégrafos D. Francisco Alegría de Quilchano, que al principiar yo este trabajo, y mientras sus ocupaciones se lo permitieron, me prestó su eficaz y desinteresada cooperacion para el desarrollo de los cálculos, y mi Secretario el telegrafista 1.° D. Ramon Forcada, quien desde que aquel se ausentó de Madrid se encargó tambien del mismo trabajo y de la parte editorial de esta obra.

EJERCICIOS, PROBLEMAS Y DISCUSIONES

SOBRE EL ALGEBRA ELEMENTAL.

LIBRO PRIMERO.

EJERCICIOS PRÁCTICOS SOBRE TODAS LAS OPERACIONES ALGEBRÁICAS.

CAPITULO I.

OPERACIONES FUNDAMENTALES.

ARTÍCULO I.

Efectuar las sumas de los polinomios siguientes:

1. $\{16a^2b^2+44b^3-66b^2-10a^2b+28b\}+\{8a^2b^2+4b^3-44b^2-16a^2b+66b\}$.

2. $\{4a^8+20a^6b-4a^8b+a^{11}-8a^5b\}+\{10a^6b-2a^8b-40a^3b^2+12a^5b+34a^3b\}+\{40a^3b-8a^5b+2a^8-2a^3b^2+8a^5\}$.

3. $\{2ab^2+3bc-7ac^2\}+\{3abc+4ab^2-7a^2b+3b^2\}+\{5a^2c-7b^2c+7ac^2\}+\{4ab^2-5a^2c-3a^2b+7abc\}$.

4. $\{2ab^2c-3a^2bc^2-5ab^2c^2\}+\{3a^2bc-7a^2b^2c+5ab^2c^2\}+\{5ab^2c^2-7a^2bc+4ab^2c^3\}+\{8a^2b^2c^2-5ab^2c^2+4a^2b^2c\}$.

5. $\{4a^3b^2c+3abc^2-7a^2b^2c^3\}+\{7ab^2c-3b^2+4ab^3+5b^2c\}+\{5ab^2-3b^2c-7ab\}+\{5a^2b^2c^3+7c^3-8ab^2c^2\}+\{7ac^2+5bc^2-7a^3c+7ac^3-8a^2b^2c^3\}+\{4ab-5b^3c^2+8b^2c^3\}$.

6. $\left\{\frac{2}{3}a^3-\frac{3}{2}ab+\frac{5}{4}b^2\right\}+\left\{\frac{2}{5}a^3+\frac{3}{7}ab-\frac{3}{8}b^2\right\}+\left\{\frac{5}{7}a^2-\frac{5}{9}ab-\frac{5}{11}b^2\right\}$.

7. $\left\{\frac{5}{12}x^7+\frac{3}{14}x^2y^2-\frac{7}{15}y^3\right\}+\left\{\frac{2}{21}x^2y^2-\frac{3}{35}y^3+\frac{2}{3}y^2\right\}+\left\{\frac{17}{18}x^7+\frac{11}{28}x^2y^2-\frac{5}{48}y^2\right\}$.

8. $\left\{\frac{3}{4}a^3b^2c+\frac{5}{8}a^2bc^3-\frac{7}{10}ab^3c^2\right\}+\left\{\frac{5}{8}a^3b^2c-\frac{7}{16}a^2bc^3+\frac{11}{40}ab^3c^2\right\}+\left\{\frac{11}{840}a^3b^2c+\frac{23}{510}ab^2c^3+\frac{17}{180}ab^3c^2\right\}+\left\{\frac{13}{740}a^2bc^3-\frac{7}{40}a^3bc^2+\frac{9}{520}a^3b^2c\right\}$.

9. $\left\{\frac{1}{4}a^4b^3c^2+\frac{7}{8}a^3b^2c^4-\frac{5}{16}a^2b^3c^4\right\}+\left\{\frac{7}{8}a^4b^3c^2+\frac{3}{4}a^2b^3c^4-\frac{13}{510}a^4b^2c^3\right\}+\left\{\frac{23}{12700}a^2b^3c^4+\frac{11}{6350}a^2b^4c^3-\frac{17}{3175}a^3b^4c^2\right\}+\left\{\frac{7}{8}a^3b^4c^2+\frac{5}{16}a^2b^4c^3-\frac{7}{125}a^4b^3c^2\right\}$.

10. $\{2,3a^2b+3,2a^3-2,2ab^2\}+\{0,5a^2+0,2ab^2-0,3a^2b\}+\{2,7a^2-7,2a^3-0,2ab^2\}$.

11. $\{4,03a^2+0,005ab-0,02b^2\}+\{0,003a^2-2,05ab+0,007b^2\}+\{3,2a^2+1,03ab+0,009b^2\}$.

12. $\left\{\frac{2}{5}a^2b^2c^3-0,4a^2bc^2+\frac{2}{5}a^2b\right\}+\left\{8a^2b^2-5ac^2+0,2b^2c\right\}+\left\{0,2a^3b+\frac{2}{5}a^2b^2-\frac{3}{4}ac^2+0,3b^2c\right\}+\{0,2a^2bc^2+0,5a^2b^2c^3+7,4a^2b^3\}$.

13. $\left\{8a^2b^2c-\frac{5}{6}ab^2c^2-\frac{7}{12}abc\right\}+\left\{0,7a^2b^2c-\frac{3}{5}ab^2c^2-7abc\right\}+\left\{3ab^2c^2-0,7a^2b^2c-\frac{7}{24}abc\right\}+\{0,4a^2b^2c+2,07ab^2c^2-3abc\}$.

14. $\{0{,}003ab^2c^3+\frac{3}{16}a^3bc^2+48a^2b^3c\}+\{\frac{7}{40}ab^2c^3+7a^3bc^2+0{,}9a^2b^3c\}+\{\frac{7}{40}a^3b^2c-2{,}3ab^2c^3-\frac{7}{16}a^2bc^3\}+\{2{,}13ab^2c^3+\frac{3}{4}ab^3c^2-\frac{7}{8}a^2bc^3\}$.

15. $\{23a^3b^4cd^2-2{,}3a^4b^3c^2d+\frac{7}{4}a^2bc^3d^4+\frac{7}{510}ab^2c^4d^3\}+\{\frac{23}{840}a^3b^4cd^2-\frac{19}{510}ab^3c^4d-\frac{3}{8}a^2bc^3d^4+\frac{7}{16}a^3b^2cd^4\}+\{0{,}7a^3b^4cd^2-\frac{11}{840}a^3b^4c^2d+\frac{3}{8}a^4b^3c^2d-2{,}4a^2bc^3d^4\}$.

16. $\{0{,}7ab^m+0{,}9a^mb+0{,}4a^mb^m\}+\{0{,}7a^mb-7{,}2ab^m\}+\{0{,}3a^nb^n+0{,}3a^mb^m-7{,}5ab\}+\{0{,}3a^mb+4{,}2ab^m\}$.

17. $\{\frac{3}{4}a^mb-\frac{4}{5}ab^m-\frac{2}{5}a^mb^m\}+\{0{,}2a^nb^m+4{,}5a^mb\}+\{\frac{3}{4}a^mb^n-\frac{5}{8}a^nb^m+\frac{4}{5}a^mb^m\}+\{3{,}2a^nb^n+4{,}2a^mb^m-7{,}4a^nb^m+7{,}5ab\}$.

18. $\{a^mb^n+3a^nb^m-2a^mb^{n-1}\}+\{a^{m-1}b^n-a^mb^n-7a^{n-1}b^m+4a^{n-1}b^{m-1}\}+\{a^mb^{n-1}-3a^{n-1}b^m+5a^mb^n\}+\{2a^{n-1}b^{m-1}-3a^{m-1}b^{n-1}-7a^{m-1}b^{m-1}\}+\{a^nb^n-7a^mb^m\}$.

19. $\{\{m+2\}x^4-\{m+1\}x^3y+mx^2y^2-\{m-1\}xy^3+\{m-2\}y^4\}+\{\{m-2\}x^4-\{m-1\}x^3y+mx^2y^2-\{m+1\}xy^3+\{m+2\}y^4\}$.

20. $\{\{m+2\}x^4+\{m+1\}x^3y+mx^2y^2+\{m-1\}xy^3+\{m-2\}y^4\}+\{\{2-m\}x^4-\{1-m\}x^3y+mx^2y^2-\{m+1\}xy^3+\{m+2\}y^4\}$.

ARTICULO II.

Restar los siguientes polinomios.

21. $\{8ab^2c^3 - 3a^2bc^3 + 5a^3bc^2\} - \{5ab^2c^3 + 3a^2bc^3 - 7a^3bc^2\}$.

22. $\{3a^2b^3c + 8ab^3c^2 - 5a^2bc^3\} - \{8a^2bc^3 - 5a^2b^3c + 8a^3bc^2\}$.

23. $\{8a^3b^4c^3 - 7a^4b^3c^3 + 8a^3b^3c^4\} - \{5a^3b^4c^3 + 3a^3b^3c^2 + 3a^3b^4c^2 - 8a^4b^3c^3\}$.

24. $\{27x^4y^3 - 30x^3y^4 + 15x^3y^2 - 17x^2y^3\} - \{-15x^4y^3 + 7x^3y^4 + 5x^3y^2 - 2x^2y^3\}$.

25. $\left\{\frac{3}{8}x^2 - \frac{4}{7}xy + \frac{2}{3}y^2\right\} - \left\{\frac{3}{4}x^2 + \frac{3}{5}xy + \frac{1}{3}y^2\right\}$.

26. $\left\{\frac{2}{3}x^3 + \frac{3}{4}xy + \frac{4}{5}y^3\right\} - \left\{\frac{5}{6}x^3 - \frac{6}{7}y^3\right\}$.

27. $\left\{\frac{2}{3}x^4 - \frac{3}{5}x^3y^2 + \frac{5}{7}x^2y^3 - \frac{3}{2}y^4\right\} - \left\{\frac{2}{5}x^4 + \frac{3}{2}x^3y^2 - \frac{3}{4}y^4\right\}$.

28. $\{0,3a^4b^3c - 3,2a^3b^4c - 0,7ab^3c^4\} - \{3a^4b^3c - 2,3ab^3c^4 - 0,7a^3b^4c\}$.

29. $\{2,75x^4y^3 + 3,5x^3y^2 - 1,25x^2y - 0,7y^4\} - \{0,85x^4y^3 + 3,5x^3y^2 + 9,3x^2y + 2,7y^4\}$.

30. $\left\{\frac{5}{4}a^7b^3c^2 + \frac{5}{7}a^4b^3c^3 - 8a^4b^3c^2\right\} - \left\{\frac{2}{3}a^3b^4c^2 - \frac{3}{7}a^3b^2c^3 - 9a^4b^3c^2\right\}$.

31. $\left\{4\frac{3}{7}ab^2c^3 + 3\frac{2}{5}a^3bc^2 - 7\frac{8}{9}a^3b^2c\right\} - \left\{2\frac{1}{2}ab^2c^3 - 7\frac{2}{3}a^3b^2c - 4\frac{5}{7}a^3bc^2\right\}$.

32. $\{7\frac{3}{4}a^5b^7c^2 - 7\frac{2}{3}a^7b^5c^2 - \frac{5}{7}a^2b^5c^7\} - \{4\frac{5}{7}a^5b^7c^2 - 4\frac{7}{11}a^7b^5c^2 - 2\frac{3}{5}a^2b^5c^7\}$.

33. $\{2,75a^5b^2 - 5a^2b^5 + 2,2a^2b^2\} - \{-1,25a^5b^2 - 9a^2b^5 - 1,8a^2b^2\}$.

34. $\{\frac{3}{5}a^4b^3c^2 + \frac{9}{8}a^2b^3c^4 + \frac{3}{4}a^4b^2c^3\} - \{3a^4b^3c^2 - 10,4a^2b^3c^4 - ab^4c^3\}$.

35. $\{3\frac{4}{5}a^4b^3c^2 - 8,5a^2b^3c^4 - 8a^3b^4c^2\} - \{2,7a^4b^3c^2 - \frac{3}{4}a^2b^3c^4 - \frac{3}{5}a^3b^4c^2\}$.

36. $\{mx^4 - \{m-1\}x^3y + \{m-2\}x^2y^2 - \{m-3\}xy^3 + \{m-4\}y^4\} - \{4x^4 + 3x^3y + 2x^2y^2 + 3xy^3 + 4y^4\}$.

37. $\{\{m+2\}x^4 + \{m+1\}x^3y + mx^2y^2 + \{m-1\}xy^3 + \{m-2\}y^4\} - \{4x^4 - 5x^3y + 6x^2y^2 - 7xy^3 + 8y^4\}$.

38. $\{mx^3 + \{m-1\}x^2y + \{m-2\}xy^2 + y^3\} - \{\{m-1\}x^3 + \{m-2\}x^2y + \{m-3\}xy^2 + \{1-m\}y^3\}$.

39. $\{\{m+2\}x^4 + \{m+1\}x^3y + mx^2y^2 + \{m-1\}xy^3 + \{m-2\}y^4\} - \{\{m-2\}x^4 + \{m-1\}x^3y + mx^2y^2 + \{m+1\}xy^3 + \{m+2\}y^4\}$.

40. $\{\{m+2\}x^4 - \{m+1\}x^3y + mx^2y^2 - \{m-1\}xy^3 + \{m-2\}y^4\} - \{\{2-m\}x^4 - \{1-m\}x^3y + mx^2y^2 - \{m+1\}xy^3 + \{m+2\}y^4\}$.

ARTÍCULO III.

Multiplicacion.

§ I.—DE UN MONOMIO POR OTRO.

41. $7a^7b^5c \times 5ab^4c^8de^5$. **42.** $5a^3b^4c^5 \times 7a^5b^3c^4$.

43. $12a^9b^4c \times 5a^7b^2c^4$. **44.** $3a^8b^4c \times \frac{1}{5}a^2b^6c^{10}$.

45. $3a^4b^3c^2 \times \frac{2}{5}a^7bd^4f^7$. **46.** $\frac{3}{4}a^3b^2c \times \frac{4}{5}a^7b^8dmnp$.

47. $3\frac{2}{3}a^7b^4c^2 \times 4\frac{5}{7}a^3b^2c$. **48.** $3\frac{4}{5}a^5b^4c^3 \times 5\frac{7}{8}a^4b^3c^5$.

49. $20a^7b^5c^2 \times 3,2a^6b^7c^9$.

50. $0,425a^7b^5c^3 \times 4a^2b^3c^4df$.

51. $0,73a^2b^3c \times 3,27a^3bc^2$.

52. $\frac{3}{4}ab^2c^3 \times 0,27a^3bc^2$.

§ II.—DE POLINOMIO POR MONOMIO.

53. $\left\{\frac{3}{4}a^3b^2c - \frac{7}{8}ab^2c^3 - \frac{5}{8}a^2b^3c\right\} 8a^2b^3c^4$.

54. $\left\{\frac{2}{5}a^4b^3c^2 - \frac{3}{4}a^4bc^3 - \frac{7}{16}a^4b^3c^4\right\} 7a^2b^2c$.

55. $\left\{\frac{2}{3}a^5b^4c^3 - \frac{5}{6}a^4b^3c^2 + \frac{5}{7}a^3b^2c\right\} \frac{3}{5}ab^2c^3$.

56. $\left\{7\frac{5}{4}a^4b^5c^3 - 5\frac{2}{5}a^5b^3c^4 - 8\frac{5}{7}a^3b^4c^5\right\} 7\frac{2}{5}a^2b^3c$.

57. $\left\{2a^7b^2c^5 + \frac{3}{5}a^8b^4c^2 - 0,7ab^3c^2\right\} \times 0,7ab^2c$.

58. $\left\{2\frac{1}{3}a^m b^n c^p - 4\frac{5}{7}a^n b^p c^m - 5\frac{7}{9}a^p b^m c^n\right\} \times 2{,}5a^m b^m c^m.$

§ III.—DE UN POLINOMIO POR OTRO.

59. $\{2ab^2c^3+3a^2b^3c-7ab^3c^2\} \times \{5a^2b^2c-7ab^2c^2+4a^2bc^2\}.$

60. $\{a^4b^5c^6+a^5b^6c^4+a^6b^5c^4\} \times \{a^3b^2c+a^2bc^3+ab^3c^2\}.$

61. $\{3ab^2c^3-2a^3bc^2+5a^2b^3c\} \times \{2a^2b^3c-5ab^2c^3-8a^3bc^2\}.$

62. $\{x^5+5ax^4+20a^2x^3+20a^3x^2+5a^4x+a^5\} \times \{x^3+3ax^2+3a^2x+a^3\}.$

63. $\{3x^4+12ax^3+18a^2x^2+12a^3x+3a^4\} \times \{3x^2+3ax+3a^2\}.$

64. $\{0{,}2a^3b^4c^3+3{,}4a^4b^5c^3+8{,}5a^3b^5c^4\} \times \{0{,}3a^3b^4+5{,}2a^4b^3-0{,}4a^5c^4\}.$

65. $\{3{,}2ab^2c^3-3{,}2a^2bc^3-7a^3bc^2\} \times \{0{,}5ab^5-3{,}2a^5b\}.$

66. $\{x^6-2{,}5ax^5+3{,}2a^2x^4-1{,}6a^3x^3+2{,}3a^4x^2-1{,}3a^5x+2{,}2a^6\} \times \{x^4-5{,}2ax^3+2{,}5a^2x^2-3{,}2a^3x+6{,}5a^4\}.$

67. $\left\{3a^4b^5c^3+\frac{3}{7}a^3b^4c^2-0{,}4a^2b^3c^4\right\} \times \left\{\frac{3}{5}a^2bd^7-0{,}4ab^4c^7-8a^2b^3p\right\}.$

68. $\left\{a^2b^5-3{,}4a^3b^2c-\frac{5}{9}ab^7c^2+4{,}3a^8mp^3\right\} \times \left\{ab^2c^3-3{,}4a^2b^2c-\frac{7}{9}a^2bd^7\right\}.$

69. $\left\{0{,}5a^7b^6c^5+\frac{3}{4}a^5b^6c^5-3a^2bc^3\right\}\times\left\{0{,}2ab^2c^4-5{,}2a^3b^2c-2a^5b^7c^6\right\}$.

70. $\left\{\frac{3}{7}a^4x^5+\frac{2}{5}a^5x^4+\frac{2}{3}a^6x^3\right\}\times\left\{\frac{3}{7}a^4x^5+\frac{2}{5}a^5x^4-\frac{2}{3}a^6x^3\right\}$.

71. $\left\{3a^3x^4+\frac{2}{3}a^4x^3-\frac{3}{2}a^5x^2\right\}\times\left\{3a^3x^4-\frac{2}{3}a^4x^3+\frac{3}{2}a^5x^2\right\}$.

72. $\left\{5x^3+\frac{20}{3}ax^2+\frac{80}{9}a^2x+\frac{320}{27}a^3\right\}\times\left\{0{,}5x-\frac{2}{3}a\right\}$.

73. $\left\{\frac{8}{3}x^4+6ax^3+\frac{27}{2}a^2x^2+\frac{243}{8}a^3x+\frac{2187}{32}a^4\right\}\times\left\{\frac{2}{3}x-\frac{3}{2}a\right\}$.

§ IV. — MULTIPLICACION DE POLINOMIOS CON COEFICIENTES ALGEBRÁICOS.

74. $\left\{\{a^2-b^2\}x^2+\{-a+b\}x+a-b\right\}\times\left\{\{a+b\}x-a+b\right\}$.

75. $\left\{\{a^2-b^2\}x^3+\{a^3-b^3\}x^2+\{a^2+b^2\}x+a^4-b^4\right\}\times\left\{\{a^2+b^2\}x^2+\{a^3+b^3\}x+a^4+b^4\right\}$.

76. $\left\{\{a^2+3a+2\}x^2+\{a^2+ab+3\}x+a^2+3ab+5\right\}\times\left\{\{a^2-3\}x^2+\{a^3-5\}x+a^5-7\right\}$.

77. $\left\{\left\{\frac{2}{3}a+\frac{3}{2}b\right\}x^2+\left\{\frac{3}{5}a^2+\frac{4}{7}b^2\right\}x+\frac{2}{7}a^3+\frac{5}{6}b^3\right\}\times\left\{\left\{\frac{2}{5}a^3-\frac{5}{6}b^3\right\}x^2+\left\{\frac{2}{3}a^2-\frac{3}{7}b^2\right\}x+\frac{5}{6}a-\frac{6}{7}b\right\}$.

78. $\{\{a^2+0,5ab+b^2\}x^2+\{0,2a-0,3b\}x+2,3a^2-3,2b^2\}\times\{\{a^2-b^2\}x^2+\{0,5a^2-5,3b^2\}x+2,2a-3,3b\}.$

79. $\left\{\left\{3a^3+\frac{2}{3}ab+0,5b^3\right\}x^2+\left\{\frac{3}{5}a^2-2ab+0,3b^2\right\}x+0,3a^3+3a^2b+\frac{2}{5}b^3\right\}\times\left\{\left\{0,4a^2+\frac{4}{5}ab+5b^2\right\}x+7a^3-0,7a^2b-\frac{3}{4}b^3\right\}.$

ARTÍCULO IV.

Division algebráica.

§ I.—DE UN MONOMIO POR OTRO.

80. $108a^{11}b^6c:12a^4b^2c.$

81. $105a^m b^8c^n : 15a^4b^3c.$

82. $\{m+n\}a^8b^9c^7:\{m+n\}a^4b^3c^2.$

83. $\{m-n\}a^9b^7c^3:\{n-m\}a^2b^3c^4.$

84. $\{m-4\}a^{2n}b^{3p}c^{4q}:\{4-m\}a^n b^{2p}c^{3q}.$

85. $-\{m-5\}a^{5n}b^{4p}c^{3q}:\{5-m\}a^n b^{2p}c^{3q}.$

86. $-\{m-5\}a^{5n}b^{4p}c^{3q}:-\{5-m\}a^{4n}b^{4p}c^{3q}.$

87. $\{m^2-1\}a^{4n}b^{3p}c^{2q}:-\{m+1\}a^4b^3c^2.$

§ II.—DE POLINOMIO POR MONOMIO.

88. $\{-18a^5b^{10}c^6+24a^7b^7c^4-30a^6b^6c^5+24a^5b^8c^5-18a^6b^6c^6\}:-6a^4b^5c^3.$

89. $\{-20a^8b^8c^6+15a^7b^7c^8-10a^6b^8c^8+20a^7b^8c^7\}:$
$-5a^4b^5c^4.$

90. $\{-0,14a^7b^5c^6+0,28a^6b^4c^5-\{0,21a^5b^3c^4+$
$0,07a^3b^3c^6\}:-0,07a^2bc^3.$

91. $\{20a^3b^2c-28a^2bc^3+16a^3bc^2-32a^2bc^4\}$
$:0,25abc.$

92. $\{a^8b^7c^6+a^6b^7c^8+a^7b^6c^8+a^7b^8c^6\}:-0,125a^2b^3c^2.$

93. $\{-9,6a^6b^5c^3+12,8a^7b^6c^4-6,4a^5b^4c^5+$
$22,4a^5b^5c^3\}:-3,2a^3b^2c.$

94. $\{12,8a^2b^4c^3d^7-28,12a^3b^5c^4d^4+8,012a^4b^6cd^5$
$-8,492a^5b^5c^2d^4\}:4ab^2d^3.$

95. $\{5,175a^3b^2c^4-7,2a^4b^3c^5+7,425a^5b^4c^6$
$-6,8175a^3b^3c^6\}:2,25a^2bc^3.$

96. $\{6,96a^{10}b^9c^7-6,96a^9b^8c^8-4,64a^8b^7c^8$
$-11,6a^9b^8c^6\}:-2,32a^5b^4c^3.$

§ III.—DE UN POLINOMIO POR OTRO.

97. $\{41a^3b^4-34a^2b^5+8a^5b^2+15ab^6-22a^4b^3\}:$
$\{3b^3+4a^2b-5ab^2\}.$

98. $\{20ab^6-3b^7-22a^4b^3+8a^5b^2+41a^3b^4-32a^2b^5\}:$
$\{2a^3b-3a^2b^2+5ab^3\}.$

99. $\{a^4x^3+10ax^5-8a^5x-3a^2x^4-x^7-25a^2x^3$
$+5a^4x^2-a^3x^4+a^7+15a^5x^2\}:\{a^3+x^3-5ax\}.$

100. $\{15a^9x^2 + 9a^6x^5 - 6a^8x^3 + 9a^7x^4 - 10a^{11}x - 6a^8x^4 + 4a^{10}x^2 - 6a^9x^3 + 15a^4x^9 + 9ax^{12} - 6a^5x^{10} + 9a^2x^{11}\} : \{5a^4x + 3ax^4 - 2a^5x^2 + 3a^2x^3\}$.

101. $\{18a^6x^2 - 38a^5x^5 - 34ax^7 + 42a^4x^4 - 13a^7x - 32a^5x^3 + 6a^8 + 15x^8 + 36a^2x^6\} : \{2a^5 - 3a^2x^3 - 3x^5 - 3a^4x + 5ax^4 + 2a^3x^2\}$.

102. $\{9a^2mnqrs - 12npqstu + 20mnprst - 15mnpstu - 12npq^2rs - 12a^2mnrst - 15mnpqrs + 9a^2mnstu + 16npqrst\} : \{3a^2mn - 5mnp - 4npq\}$.

103. $\{0,996a^5x^2 - 16,5a^2x^5 - 0,96a^6x + 1,599a^3x^4 + 0,6a^7 - 0,999a^4x^3\} : \{0,03a^2x^2 - 5ax^3 + 3a^4 - 0,3a^3x\}$.

§ IV.—CASOS EN QUE EL DIVIDENDO CONTIENE UNA LETRA QUE NO ENTRA EN EL DIVISOR.

104. $\{\{5a^4b + 10a^2b^3 + b^5 + 10a^3b^2 + 5ab^4 + a^5\}xy + \{3a^4b^2 + 3ab^5 + b^6 + 3a^5b + 3a^2b^4 + a^6 + 2a^3b^3\}y + \{a^4b - 2a^2b^3 + b^5 - 2a^3b^2 + ab^4 + a^5\}x^2 + \{7a^3b^2 + 4ab^4 + a^5 + 7a^2b^3 + b^5 + 4a^4b\}y^2 + \{3a^3b - 3a^2b^4 - 3ab^3 + a^6 - b^6 + 3a^4b^2\} + \{a^3b^2 + 2ab^4 + a^5 + a^2b^3 + b^5 + 2a^4b\}x\} : \{3ab^2 + b^3 + 3a^2b + a^3\}$.

105. $\{\{3x^2y^2 + 3x^4 + 6xy^2 + 5x^3 + 3x^3y + y^3 + 6x^2y\}2ab + \{x^2y^2 + 3x^2y + y^3 + x^3y + 3xy^2 + x^4 + 2x^3\}a^2 + \{x^3y^2 - 3xy^3 + x^4y - 3x^2y^2 + xy^4 + x^2y^3 + y^5 - 3x^3y + x^5\}b^2\} : \{xy + y^2 + x^2\}$.

106. $\{\{2xy^2z^2+4x^3yz-y^3z^2+2x^2yz^2-2xy^3z-2x^3y^2+x^3z^2-2x^4y+x^2y^3-x^5+4x^2y^2z+2x^4z\}a^3+\{2x^4y^2-2x^2y^4-x^4y-2x^2y^3-2xy^5+x^6-2x^3y^2+2x^5y+xy^4+y^6-2x^3y^3\}b^3+\{2x^2y^2-xy^3-2xy^3z-x^3yz+2x^3y+4x^2y^3z-2xy^4z+2x^4yz-2x^2y^2z+x^4+zy^4+4x^3y^2z\}c^3\}:\{2xy^2+2x^2y-y^3+x^3\}.$

107. $\{2a^2bc^3-3ab^3c^2+3a^3b^2c+\{27a^9b^6c^3+36a^7b^4c^7+81a^5b^8c^5+54a^8b^5c^5-81a^7b^7c^4-36a^5b^5c^8-27a^3b^9c^6-108a^6b^6c^6+54a^4b^7c^7+8a^6b^3c^9\}x^2+\{81a^{12}b^8c^4+16a^8b^4c^{12}+81a^4b^{12}c^8+216a^{10}b^6c^8+486a^8b^{10}c^6+216a^6b^8c^{10}+216a^{11}b^7c^6-648a^9b^8c^7-96a^7b^6c^{11}+96a^9b^5c^{10}-432a^8b^7c^9-324a^6b^{11}c^7-324a^{10}b^9c^5+648a^7b^9c^8-216a^5b^{10}c^9\}x^3+\{9a^6b^4c^2-12a^3b^4c^5+4a^4b^2c^6+9a^2b^6c^4+12a^5b^3c^4-18a^4b^5c^3\}x\}:\{2a^2bc^3-3ab^3c^2+3a^3b^2c\}.$

108. $\{\{9am^2-6amn+3ap+6bm^2-4bmn+2bp\}xy+\{9a^2m^2+2bp-6a^2mn+6bm^2+3a^2p-4bmn\}y^2+\{3a^2m^2-6abm^2-2abp-2a^2mn+4abmn+a^2p\}x+\{9m^3+3mp+2p^2+6m^2p-4mnp-6m^2n\}x^2+\{9m^4+6m^2p+p^2-12m^3n-4mnp+4m^2n^2\}+\{3b^2m^2-2b^2mn+b^2p-6abm^2+4abmn-2abp\}y\}:\{p+3m^2-2mn\}.$

109. $\{\{81x^2+27+27x^3+81x\}a^2+\{x+3\}+\{30x+9+25x^2\}a+\{12x+9+4x^2\}a^3\}:\{x+3\}.$

§ V.—EJEMPLOS PARA HALLAR DIRECTAMENTE LOS COCIENTES Y RESTOS SIN HACER LA DIVISION.

110. $\{x^5-32\}:\{x-2\}$.

111. $\{x^6-729\}:\{x-3\}$.

112. $\{x^7-0,0000128\}:\{x-0,2\}$.

113. $\{x^8-5764801\}:\{x-7\}$.

114. $\{x^4-14641\}:\{x+11\}$.

115. $\{x^5+248832\}:\{x+12\}$.

116. $\{x^7+62748517\}:\{x+13\}$.

117. $\{x^3-8,120601\}:\{x+2,01\}$.

118. $\{x^4-16,98181681\}:\{x+2,03\}$.

119. $\{x^5-33,6323216032\}:\{x+2,02\}$.

120. $\{x^6-7,529536\}:\{x+1,4\}$.

121. $\{x^5+36,264691\}:\{x-3,31\}$.

122. $\{x^4+27,9841\}:\{x-2,3\}$.

123. $\{x^5+14,19857\}:\{x-1,7\}$.

124. $\{x^6+85,766121\}:\{x-2,1\}$.

125. $\{x^5+1,061208\}:\{x+1,02\}$.

126. $\{x^4+83,18169616\}:\{x+3,02\}$.

127. $\{x^7+9493,1877133\}:\{x+3,7\}$.

128. $\{2ab^2x^2+2ab^2+3a^2bx^3+5a^2bx\}:\{x-3a^2b\}$.

129. $\{6a^4b^8c^9x+5a^8b^{16}c^{18}+4a^2b^4c^6x^2+2ab^2c^3x^3\}:\{x-3ab^2c^3\}$.

130. $\{a^3b^2cx^4+5a^{27}b^{18}c^9x^2-2a^9b^6c^3x^3+3a^8b^6c^4-a^{81}b^{54}c^{27}x\}:\{x-2a^6b^4c^2\}$.

131. $\Big\{\{3a^2+2b^2\}x^3+\{2a^2-3b^2\}x^2+\{5a^4-3b^4\}x+a^6-2b^6\Big\}:\{x-\{a^2-b^2\}\Big\}$.

132. $\Big\{\{a^3-b\}x^4-\{a-b^3\}x^3+\{a^2-b\}x^2-\{a-b^2\}x+a^4-b\Big\}:\Big\{x-\{a-b^4\}\Big\}$.

133. $\{5x^4+3x^3+7x^2+6x+8\}:\Big\{x-\{a^2-3b+5\}\Big\}$.

134. $\Big\{\{a^2-5\}x^4+\{3-b^2\}x^3+\{a^2-b\}x^2+a^2-7ab+5\Big\}:\Big\{x-\{a^3-2b+2\}\Big\}$.

§ VI.—DIVISION DE POLINOMIOS CON COEFICIENTES ALGEBRÁICOS.

135. $\Big\{\{2ab^3-2a^3b\}x^2+\{b^4-a^4-2ab^3+2a^3b\}+\{a^4-b^4\}x^3\Big\}:\Big\{\{a^2+b^2-2ab\}x+\{a^2+b^2-2ab\}+\{a^2+b^2\}x^2\Big\}$.

136. $\Big\{\{19a^2-4b^2-7bc+ac-3c^2+2ab\}x^2+\{2bc+11a^2-6b^2-3c^2-17ab-17ac\}+\{2bc+6b^2+19ab+5ac+10a^2\}x^3+2a^2-7ac+9bc+6c^2-6ab\Big\}:\Big\{\{c-2b+3a\}x+\{3b+2a+c\}x^2+a-2c-3b\Big\}$.

137. $\{\{5mn^2-2n^3+3m^3n^2-3mn^4-n^5-4m^2n+m^2n^3+m^3\}x+\{m^4-6m^2n^2+m^3n\}x^3+\{3m^2n^2-2n^4+m^5-m^3n^2-5mn^3+3m^4n-3m^2n^3\}x^2+m^4-2m^3n+2mn^3-n^4\} : \{\{3mn^2+n^3\}x+\{m^3+3m^2n\}x^2+n^2-2mn+m^2\}$.

138. $\{bc-m+b-cm+\{am-m-a+a^2\}x^3+\{bm-am-m^2-b-1+a+2ab\}x^2+\{b^2-1+a-c-bm+b-m+ac\}x\} : \{\{1+b\}x+\{c+1\}+\{m+a\}x^2\}$.

139. $\{b^2c^2-c^2-1+b^2+\{bc^2+b^4+2-2b^2+c^2+b\}x+\{a^2-1\}x^4+\{ac^2+b^3-b+ab^2-3+2b^2-c^2\}x^2+\{ab^2-b^2+ab+b+2\}x^3\} : \{\{b^2-1\}x+\{1+a\}x^2+1+c^2\}$.

140. $\{\{3a^4+2a^2-a^2b+2b^3-ab-2b^2+1-a^3b+a+a^3\}x^3+\{a^4+a^2+b^2-a^3b-ab^3+a^2b^2\}x^3+\{2a^4+2ab-2a+2a^2\}x+\{2a^4+2a^2-b^3-a^3b-a^2b+ab^3\}x^4+\{3a^2-2ab+3a^4-a^2b^2+b^2+2-b^3-a^3b-b+a^2b\}x^2+a^4+a^2b-a^3-ab+a+b-1\} : \{\{a^2-b^2\}x^2+a^2+1-a+\{a^2+1+a\}x+\{b^2+a^2\}x^3\}$.

CAPITULO II.

MÁXIMO COMUN DIVISOR Y MÍNIMO COMUN MÚLTIPLO.

ARTICULO I.

Máximo comun divisor.

§ I.—DE POLINOMIOS QUE SOLO TIENEN UNA LETRA.

141. $9x^9+36x^8+18x^7-18x^6-18x^5-18x^4-9x^3$;
$6x^7+12x^5+6x^4-18x^3-6x^2$.

142. $14x^9+28x^8-14x^6+14x^5-28x^3-14x^2$;
$21x^{10}-42x^9+42x^8+63x^7-105x^6+42x^5$
$+42x^4-63x^3$.

143. $6x^{10}-18x^9-6x^8+24x^7+30x^6+42x^5-30x^4$
$-48x^3$;
$15x^{10}-60x^9-45x^8-75x^6+60x^5+105x^4$.

144. $8x^{12}-24x^{11}-48x^{10}+224x^9-224x^8-64x^7$
$+48x^6-64x^5+216x^4-72x^3$;
$40x^{13}-120x^{12}-320x^{11}+1160x^{10}-360x^9$
$-680x^8-80x^7-360x^6+720x^5$.

145. $5x^{13}-5x^{12}+5x^{10}-10x^9+5x^8-5x^6+5x^5$;

$15x^{12}-45x^{11}+15x^{10}+15x^9-75x^8+60x^7-30x^5+45x^4$.

146. $28x^8-112x^6+84x^4$;

$245x^7+735x^6-245x^5-2205x^4-1470x^3$.

147. $x^5-9x^3+3x^2+20x-12$;

$x^4+2x^3-2x^2-8x-8$.

148. $x^5+7x^4+19x^3+26x^2+20x+8$;

$x^6+8x^5+23x^4+32x^3+33x^2+36x+20$.

149. $169x^9+507x^8+169x^7-507x^6-338x^5$;

$156x^6-468x^5+156x^4+468x^3-312x^2$.

150. $1715x^8+10290x^7+17150x^6-18865x^4-10290x^3$;

$875x^7+6125x^6+17500x^5+38500x^4+65625x^3+39375x^2$.

§. 11.—DE POLINOMIOS CON DOS LETRAS.

151. $30x^8y-120x^7y^2+60x^6y^3+60x^5y^4-60x^4y^5+60x^3y^6-30x^2y^7$;

$6x^6y+18x^5y^2+12x^4y^3-12x^3y^4-18x^2y^5-6xy^6$.

152. $10x^9y^4 - 50x^7y^4 - 10x^9y^2 + 10x^7y^2 - 40x^8y^5$
$+90x^6y^5 + 40x^8y^5 - 40x^6y^5 + 40x^7y^6 - 50x^5y^6$
$+40x^5y^4 - 50x^6y^7 + 50x^4y^7 - 50x^4y^5 + 10x^5y^8$
$-10x^3y^8 + 10x^3y^6;$

$15x^7y^5 - 45x^5y^5 - 15x^7y^3 + 15x^5y^3 - 30x^6y^6$
$+45x^4y^6 + 30x^6y^4 - 30x^4y^4 + 30x^5y^7 - 30x^3y^7$
$+30x^3y^5 - 15x^4y^8 + 15x^2y^8 - 15x^2y^6.$

153. $10x^9y^4 - 10x^9y^2 + 10x^9y^3 - 20x^7y^3 - 10x^9y$
$+10x^7y - 10x^8y^4 + 10x^6y^4 + 10x^8y^2 - 10x^6y^2$
$-10x^8y^3 + 10x^6y^3 + 10x^8y - 10x^6y + 10x^7y^3$
$-10x^5y^5 + 10x^5y^3 - 10x^3y^4 + 10x^5y^2 - 20x^4y^3$
$+20x^2y^3 + 10x^4y^3 - 10x^2y^5 + 20x^4y^7 - 20x^2y^7$
$-10x^4y^9 + 10x^2y^9 - 10x^4y^8 + 10x^2y^8 + 10x^4y^6$
$-10x^2y^6;$

$5x^7y^6 - 5x^5y^6 - 5x^7y^2 + 5x^5y^2 - 10x^6y^7 +$
$10x^4y^7 + 10x^6y^3 - 10x^4y^3 + 15x^5y^8 - 15x^3y^8$
$-15x^5y^4 + 15x^3y^4 - 10x^4y^9 + 10x^2y^9 + 10x^4y^5$
$-10x^2y^5 + 5x^5y^{10} - 5xy^{10} - 5x^3y^6 + 5xy^6.$

154. $8x^6y^6 + 2x^4y^8 + 2x^8y^4 + 8x^7y^3 - 10x^5y^7 - 2x^7y^4$
$-2x^8y^2 - 8x^6y^4 + 10x^5y^5 - 2x^3y^8 - 2x^4y^6$
$-8x^6y^3 - 8x^5y^6 + 8x^6y^5 + 2x^7y^2 - 10x^4y^5 +$
$10x^4y^7 + 8x^5y^4 + 2x^3y^6 - 8x^7y^5;$

$3x^6y^5 + 6x^4y^6 + 3x^2y^8 - 6x^4y^4 - 6x^3y^7 - 6x^4y^5$
$-3x^3y^8 - 6x^5y^6 + 3x^5y^5 - 3x^3y^5 + 6x^4y^7 +$
$6x^5y^4 + 3x^5y^6 - 3x^6y^5 - 3x^2y^6 + 6x^3y^5.$

155. $12x^{10}y^4+12x^7y^4-24x^8y^4-24x^5y^4-12x^{10}y^2$
$-12x^7y^2+12x^8y^2+12x^5y^2-12x^9y^5-12x^6y^5$
$+24x^7y^5+24x^4y^5+12x^9y^3+12x^6y^3-12x^7y^3$
$-12x^4y^3+12x^8y^6+12x^5y^6-12x^6y^6-12x^3y^6$
$+12x^6y^4+12x^3y^4-12x^7y^7-12x^4y^7+12x^5y^7$
$+12x^2y^7-12x^5y^5-12x^2y^5;$

$9x^{10}y^6+18x^8y^6+18x^5y^6+9x^{10}y^4+18x^8y^4$
$+18x^5y^4-9x^{10}y^5-18x^8y^5-18x^5y^5-9x^{10}y^3$
$-9x^7y^3-18x^8y^3-18x^5y^3-9x^9y^7-9x^6y^7$
$+9x^7y^7+9x^4y^7-9x^9y^5+18x^6y^5+9x^4y^5$
$+9x^9y^6-18x^6y^6-9x^4y^6+9x^9y^4-18x^6y^4$
$-9x^4y^4-27x^3y^6-27x^5y^4+27x^5y^5+27x^6y^3$
$+27x^3y^3.$

156. $9x^{12}y^5+9x^9y^5-18x^{10}y^5-18x^7y^5-9x^{12}y^3$
$-9x^9y^3+9x^{10}y^3+9x^7y^3-9x^{11}y^6-9x^8y^6+$
$18x^9y^6+18x^6y^6+9x^{11}y^4+9x^8y^4-9x^9y^4$
$-9x^6y^4+9x^{10}y^7+9x^7y^7-18x^8y^7-18x^5y^7+$
$9x^8y^5+9x^5y^5-9x^9y^8-9x^6y^8+9x^7y^8+$
$9x^4y^8-9x^7y^6-9x^4y^6+9x^8y^9+9x^5y^9-9x^6y^9$
$-9x^3y^9+9x^6y^7+9x^3y^7;$

$12x^{10}y^4+12x^7y^4-24x^8y^4-24x^5y^4-12x^{10}y^2$
$-12x^7y^2+12x^8y^2+12x^5y^2-12x^9y^5-12x^6y^5$
$+24x^7y^5+24x^4y^5+12x^9y^3+12x^6y^3-12x^7y^3$
$-12x^4y^3+12x^8y^6+12x^5y^6-12x^6y^6-12x^3y^6$
$+12x^6y^4+12x^3y^4-12x^7y^7-12x^4y^7+12x^5y^7$
$+12x^2y^7-12x^5y^5-12x^2y^5.$

157. $6x^9y^5+24x^8y^5-6x^9y^2-6x^8y^2+18x^7y^5$
$+6x^6y^5-36x^7y^4-18x^6y^4-18x^8y^4+18x^7y^3$
$+12x^6y^6+36x^5y^6-12x^5y^5-24x^5y^7-30x^4y^7$
$+24x^4y^6+6x^4y^8+6x^3y^8-6x^3y^7;$

$9x^7y^4 + 36x^6y^4 - 9x^7y^3 - 27x^4y^6 - 27x^3y^3$
$-27x^6y^3 + 27x^3y^4 + 27x^4y^7 + 36x^3y^7 - 27x^3y^6$
$-9x^3y^8 - 9x^2y^8 + 9x^2y^7 - 9x^6y^3.$

158. $8x^8y^3 + 48x^7y^3 + 96x^6y^3 + 64x^5y^3 + 216x^8y^3$
$-72x^8y^4 + 1296x^7y^3 - 864x^6y^4 + 2592x^6y^3$
$-432x^7y^4 + 1728x^5y^3 - 2592x^6y^2 - 1728x^5y^2$
$-576x^5y^4 - 216x^8y^2 - 1296x^7y^2;$

$4x^4y^7 - 1080x^4y^4 + 16x^3y^7 - 60x^4y^6 + 1440x^3y^3$
$-240x^2y^6 + 6480x^2y^3 - 240x^3y^6 + 6480x^3y^3$
$-972x^4y^2 + 16x^2y^7 - 3888x^2y^2 + 360x^4y^3$
$-4320x^2y^4 + 1620x^4y^3 - 3888x^3y^2 + 1440x^2y^3$
$-4320x^3y^4.$

159. $80x^3y^3 - 320x^6y^3 - 20x^3y^6 + 20x^7y^4 + 320x^6y^2$
$-80x^4y^6 - 320x^4y^4 + 320x^3y^2 - 80x^3y^6 +$
$80x^6y^4 + 80x^7y^2 - 80x^7y^3 + 320x^4y^3 - 320x^3y^3$
$-320x^3y^4 + 320x^3y^3;$

$30976x^{19}y^9 - 92928x^8y^9 + 185856x^9y^7 +$
$3872x^{22}y^9 + 46464x^{20}y^9 - 11616x^{12}y^8$
$-139392x^9y^9 - 46464x^{11}y^8 + 185856x^9y^8$
$-92928x^{22}y^7 - 61952x^{20}y^8 + 3872x^{23}y^8$
$-61952x^{19}y^8 - 11616x^{11}y^9 - 61952x^{20}y^7$
$-69696x^{10}y^9 + 15488x^{22}y^8 + 23232x^{12}y^7$
$-92928x^{21}y^7 + 139392x^{11}y^7 + 23232x^{21}y^9 +$
$278784x^{10}y^7 + 185856x^8y^8 - 7744x^{23}y^7.$

160. $12x^{11}y^3 + 24x^{10}y^3 + 12x^9y^3 - 60x^{10}y^4 - 120x^9y^4$
$-60x^8y^4 + 108x^9y^3 + 216x^8y^3 + 108x^7y^3$
$-60x^8y^6 - 120x^7y^6 - 60x^6y^6 - 60x^7y^7$
$-120x^6y^7 - 60x^5y^7 + 108x^6y^8 + 216x^5y^8 +$
$108x^4y^8 - 60x^5y^9 - 120x^4y^9 - 60x^3y^9 + 12x^4y^{10}$
$+24x^3y^{10} + 12x^2y^{10};$

$$18x^{11}y^2+36x^{10}y^2+18x^9y^2-18x^{10}y^3-36x^9y^3 - 18x^8y^3 - 90x^8y^3 - 180x^7y^3 - 90x^6y^3 + 180x^7y^6 + 360x^6y^6 + 180x^5y^6 - 108x^6y^7 - 216x^5y^7 - 108x^4y^7 + 18x^5y^8 + 36x^4y^8 + 18x^3y^8.$$

§. III.—DE POLINOMIOS CON TRES LETRAS.

161. $15x^3yz^2 + 15x^3yz + 15x^4y^2z^2 + 15x^4y^2z - 15x^3yz^2 - 15x^2y^2z^2 - 15x^3yz - 15x^2y^2z;$

$21x^3yz^2 + 21x^4y^2z^2 + 42x^4yz^2 + 42x^3y^2z^2 + 21x^3yz + 21x^4y^2z + 42x^4yz + 42x^3y^2z + 21x^3yz^2 + 21x^2y^2z^2 + 21x^3yz + 21x^2y^2z.$

162. $42x^3y^4z^2 + 21x^4y^3z^2 + 7x^3y^4z^3 + 21x^4y^4z + 7x^3y^3z^2 + 14x^4y^4z^2 + 21x^3y^3z^3 + 7x^4y^3z + 21x^3y^3z + 7x^4y^3z^3 + 21x^2y^3z^2 + 7x^3y^3z^2 + 21x^2y^4z^3 + 7x^3y^4z;$

$35x^4y^4z^2 + 7x^4y^4z + 35x^4y^3z^3 + 7x^4y^3z^2 + 70x^3y^4z^3 + 14x^3y^4z^2 + 35x^3y^3z^4 + 7x^3y^3z^3 + 35x^3y^3z^2 + 7x^3y^3z + 35x^2y^3z^3 + 7x^2y^3z^2 + 35x^2y^4z^4 + 7x^2y^4z^3.$

163. $3x^4 + 2x^3y + 5x^3z + 7x^2z^3 + 3x^2y^2 + 2xy^3 + 5xy^2z + 7y^2z^3 + 3x^2z^2 + 2xyz^2 + 5xz^3 + 7z^3;$

$15x^4 + 19x^3y + 46x^3z + 35x^2z^3 + 6x^2y^2 + 35x^2yz + 21xyz^3 + 38x^2z^2 + 49xz^4 + 4xy^2z + 12xyz^2 + 14yz^4 + 5xz^3 + 7z^3.$

164. $3x^3y^4z^2 - 3x^3y^2z^2 - 3xy^4z^2 + 3xy^2z^2 + 3x^3y^2z^4 - 3x^3z^4 - 3xy^2z^4 + 3xz^4;$

$6x^3y^3z + 12x^3y^3z^3 + 6x^3yz^3 + 6x^2y^3z + 12x^2y^3z^3 + 6x^2yz^3 - 6x^3y^4z - 12x^2y^2z^3 - 6x^3z^3 - 6x^2y^4z - 12x^2y^2z^3 - 6x^2z^3.$

165. $6x^4y^5z+12x^4y^5z^5+6x^4yz^5+6x^3y^5z+12x^3y^5z^5$
$+6x^3yz^5-6x^4y^4z-6x^4z^5-6x^3y^4z-12x^4y^2z^5$
$-12x^3y^2z^5-6x^3z^5+6x^3y^3z^2+12x^3y^5z^4+$
$6x^3yz^6+6x^2y^5z^2+12x^2y^3z^4+6x^2yz^6-6x^3y^4z^2$
$-12x^3y^2z^4-6x^3z^6-6x^2y^4z^2-12x^2y^2z^4$
$-6x^2z^6;$

$3x^4y^4z^2-3x^4y^2z^2-3x^2y^4z^2+3x^2y^2z^2+3x^4y^2z^4$
$-3x^4z^4-3x^2y^2z^4+3x^2z^4+3x^3y^4z^3-3x^3y^2z^3$
$-3xy^4z^3+3xy^2z^3+3x^3y^2z^3-3x^3z^3-3xy^2z^3$
$+3xz^3.$

166. $6x^4y^4z^2-6x^4y^2z^2-6x^2y^4z^2+6x^2y^2z^2+6x^4y^2z^4$
$-6x^4z^4-6x^2y^2z^4+6x^2z^4+3x^3y^4z^2-3x^3y^2z^2$
$-3xy^4z^2+3xy^2z^2+3x^3y^2z^4-3x^3z^4-3xy^2z^4$
$+3xz^4;$

$12x^4y^5z+24x^4y^3z^3+12x^4yz^5+18x^3y^5z+$
$36x^3y^3z^3+18x^3yz^5-12x^4y^4z-24x^4y^2z^3$
$-12x^4z^5-18x^3y^4z-36x^3y^2z^3-18x^3z^5+$
$6x^2y^5z+12x^2y^3z^3+6x^2yz^5-6x^2y^4z-12x^2y^2z^3$
$-6x^2z^5.$

167. $18x^4y^5z+36x^4y^3z^3+18x^4yz^5+30x^3y^5z+$
$60x^3y^3z^3+30x^3yz^5-18x^4y^4z-36x^4y^2z^3$
$-18x^4z^5-30x^3y^4z-60x^3y^2z^3-30x^3z^5+$
$12x^2y^5z+24x^2y^3z^3+12x^2yz^5-12x^2y^4z$
$-24x^2y^2z^3-12x^2z^5;$

$9x^4y^4z^2-9x^4y^2z^2-9x^2y^4z^2+9x^2y^2z^2+9x^4y^2z^4$
$-9x^2y^2z^4+9x^2z^4+6x^3y^4z^2-6x^3y^2z^2-6xy^4z^2$
$+6xy^2z^2+6x^3y^2z^4-6x^3z^4-6xy^2z^4+6xz^4$
$-9x^4z^4.$

168. $67200x^8y^5z^4 + 50400x^6y^7z^4 + 33600x^6y^5z^6$
$+41520x^6y^5z^4 + 13440x^8y^5z^2 + 10080x^6y^7z^2$
$+ 6960x^6y^5z^2 + 11200x^8y^5z^4 + 5600x^6y^5z^6$
$+ 5520x^6y^5z^4 + 2240x^8y^5z^2 + 880x^6y^5z^2$
$+ 7200x^4y^7z^4 + 4800x^4y^5z^6 + 4560x^4y^5z^4$
$+ 1440x^4y^7z^2 + 720x^4y^5z^2 + 800x^4y^5z^6$
$+ 560x^4y^5z^4 + 80x^4y^5z^2 + 67200x^8y^6z^5$
$+ 50400x^6y^8z^5 + 33600x^6y^6z^5 + 41520x^6y^6z^5$
$+ 13440x^8y^6z + 10080x^6y^8z + 6960x^6y^6z$
$+ 11200x^8y^4z^5 + 5600x^6y^4z^5 + 5520x^6y^4z^5$
$+ 2240x^8y^4z + 880x^6y^4z + 7200x^4y^8z^5$
$+ 4800x^4y^6z^5 + 4560x^4y^6z^5 + 1440x^4y^8z$
$+ 720x^4y^6z + 800x^4y^4z^5 + 560x^4y^4z^5 +$
$80x^4y^4z;$

$60480x^7y^4z^5 + 45360x^5y^6z^5 + 30240x^5y^4z^7$
$+37368x^5y^4z^5 + 12096x^7y^4z^5 + 9072x^5y^6z^5$
$+ 6264x^5y^4z^5 + 10080x^7y^2z^5 + 5040x^5y^2z^7$
$+ 4968x^5y^2z^5 + 2016x^7y^2z^5 + 792x^5y^2z^5$
$+ 6480x^5y^6z^5 + 4320x^5y^4z^7 + 4104x^5y^4z^5$
$+ 1296x^5y^6z^5 + 648x^5y^4z^5 + 720x^5y^2z^7$
$+ 504x^5y^2z^5 + 72x^5y^2z^5 - 60480x^7y^5z^4$
$-45360x^5y^7z^4 - 30240x^5y^5z^6 - 37368x^5y^5z^4$
$-12096x^7y^5z^2 - 9072x^5y^7z^2 - 6264x^5y^5z^2$
$- 10080x^7y^3z^4 - 5040x^5y^3z^6 - 4968x^5y^3z^4$
$- 2016x^7y^3z^2 - 792x^5y^5z^2 - 6480x^5y^7z^4$
$- 4320x^5y^5z^6 - 4104x^5y^5z^4 - 1296x^5y^7z^2$
$- 648x^5y^5z^2 - 720x^5y^3z^6 - 504x^5y^3z^4$
$-72x^5y^5z^2.$

ARTICULO II.

Mínimo comun múltiplo,

§ I.—DE MONOMIOS.

169. $143a^7b^{11}c^3$; $221a^9b^6x^8$.

170. $323a^3b^8x^4$; $357a^{13}x^{11}y^{14}$.

171. $437a^{13}b^{17}x^8$; $575a^6x^{13}y^8$; $725b^{17}x^4y^{14}$

172. $377a^{23}b^{13}x^{11}$; $527b^{20}x^{12}y^{19}$; $1023x^{20}y^{21}z^{13}$.

173. $9438a^m b^n x^p$; $6413a^n b^m x^p$; $4134a^p b^m x^n$.

174. $\{m+1\}a^7b^6x^5$; $\{m-1\}a^9b^8x^5$.

175. $\{a^2-1\}b^m x^3$; $\{a+1\}b^3x^m$; $\{a^2+1\}b^p x^q$.

176. $\{m^3-8\}a^2b^p x^q$; $\{m-2\}a^p b^2x^5$; $\{m+2\}a^3b^5x^3$.

177. $\{m^4-16\}a^n b^2x^p$; $\{m-2\}a^3b^m x^4$; $\{m+2\}a^3b^7x^5$.

§. II.—DE DOS POLINOMIOS.

178. $x^5-11x^3-6x^2+28x+24$;
$x^5+59x^3-14x^4-34x^2-252x+360$.

179. $x^5-8x^2+7x^4-56x+10x^3-80$;
$x^5-8x^2-x^4+8x-2x^3+16$.

180. $x^7+5x^6-8x^5-51x^4-55x^3+64x^2+344x+120$;
$x^7-2x^6-22x^5+6x^4+121x^3+176x^2-112x-840$.

181. $x^5-3a^2x^3-ax^4+a^3x^2+2a^4x+bx^4-3a^2bx^2$
$-abx^3+a^3bx+2a^4b;$
$3x^5-2a^2x^3+4ax^4-4a^3x^2-a^4x+6bx^4-4a^2bx^2$
$+8abx^3-8a^3bx-2a^4b.$

182. $3x^3y^2-2y^5+7x^2-2y^3+3x^3+7x^2y^2-7y^4$
$+2x^2y-3xy^4-3xy^2+2x^2y^3-7y^2;$
$3x^3y^2+2x^2y^3+7y^4-2x^2y-2y^3-7x^2+3xy^4$
$+2y^5-3x^3-7y^2+7x^2y^2-3xy^2.$

183. $x^5-2x^4+9x^2+x^4y-2x^3y+9xy-15x^3+27x$
$-15x^2y+27y;$
$x^5-8x^4+9x^2-x^4y+8x^3y-9xy+15x^3-27x$
$-15x^2y+27y.$

184. $x^6z^2+4x^4y^2z^2+x^2y^4z^2-x^4z^2-4x^2y^2z^2-y^4z^2$
$+x^6+4x^4y^2+x^2y^4-x^4-4x^2y^2-y^4;$
$x^6+4x^4y^2+x^2y^4+x^4z^2+4x^2y^2z^2+y^4z^2.$

185. $0,5x^5+x^3y^2+1,5x^3z^2+0,3x^2z^3+0,6y^2z^3$
$+0,9z^5;$
$x^4+2x^2y^2+4x^2z^2+2,3x^2y+4,6y^3+6,9yz^2$
$+2y^2z^2+3z^4.$

186. $0,5x^7+0,2x^4y+0,3x^3y^3+0,15x^3z+0,06x^2yz$
$+0,09xy^3z+0,5x^4z^3+0,2xyz^3+0,3y^3z^3;$
$0,5x^5+0,2x^2y+0,3xy^3+0,5x^4y+0,2xy^2$
$+0,3y^4+0,5x^4z+0,2xyz+0,3y^3z.$

§. III.—DE TRES POLINOMIOS.

187. $x^2-4;\quad x^3-8;\quad x^4-16.$

188. $x^2+25;\quad x^3-5x^2+25x-125;\quad x^4-625.$

189. $x^8-2x^7+5x^6+6x^5-26x^4+4x^3-10x^2-12x+48$;

$x^9-6x^7+5x^6+7x^5-15x^4+12x^3-10x^2-18x+30$;

$x^{10}-5x^8+11x^6-11x^4-26x^2+42$.

190. x^2-a^2; x^3-a^3; x^4-a^4.

191. x^2-a^2; x^2+a^2; x^3-a^3.

192. x^2+a^2; x^3+a^3; x^4+a^4.

193. $x^7+x^6y+2x^5+2x^4y-3x^3y-3x^4-6xy-6x^2+x^5y^2+2x^3y^2-3x^2y^2-6y^2$;

$x^7+2x^5-3x^4-6x^2-2x^6y-4x^4y+6x^3y+12xy-3x^5y^2-6x^3y^2+9x^2y^2+18y^2$;

$x^7+3x^6y+3x^5y+2x^6+x^5y^2+2x^5+6x^4y-3x^3y+x^4+2x^3y^2-9x^2y-6x^3-3x^2y^2-6x^2-18xy+18y-12x-6y^2$.

194. $6x^8y^2+6x^7y^3-6x^8y+12x^6y^3-6x^7y-12x^6y^2+6x^5y^4+6x^4y^4+6x^5y^2+6x^4y^3-12x^5y+12x^3y^3-12x^4y-12x^3y^2$;

$10x^6y^2+10x^5y^3-10x^6y-10x^4y^2-10x^5y^2-10x^3y^3+10x^4y+10x^3y^2$;

$\{12x^3+12x^2\}y^3+\{12x^4+12x^3\}y^4+\{-12x^3-12x^2\}y^3+\{-12x^4-12x^3\}y^2$.

195. $x^3+5x^2y+3xz+x^2z+5xyz+3z^2$;

$x^3+5x^2y+3xz-x^2z-5xyz-3z^2$;

$x^4+5x^3y+3x^2z-x^2z^2-5xyz^2-3z^3$.

CAPITULO III.

FRACCIONES.

ARTICULO I.

Suma.

196. $\frac{a}{b}+\frac{b}{a}+2$. **197.** $\frac{a-b}{c-d}+\frac{c-d}{a-b}-2$.

198. $\frac{a}{a^2-b^2}+\frac{b}{a+b}-\frac{c}{a-b}$. **199.** $\frac{a+b}{(a-b)^3}+\frac{a-b}{(a+b)^2}-\frac{a^2+b^2}{a^2-b^2}$.

200. $\left\{\frac{a}{a+b}+\frac{b}{a+c}\right\}+\left\{\frac{c}{a+b}-\frac{a}{b+c}\right\}$.

201. $\left\{\frac{a+b}{a-b}+\frac{a-b}{a+b}+\frac{2a+b}{a^2-b^2}\right\}+\left\{\frac{2a}{a+b}+\frac{a}{a-b}+\frac{2b}{a^2-b^2}\right\}$.

202. $\left\{\frac{2a}{a+b}+\frac{3b}{a-b}+\frac{3a^2}{a^2-b^2}\right\}+\left\{\frac{5a^2b}{a^3-b^3}+\frac{3ab}{a^2+b^2}+\frac{3a^2b^2}{a^4-b^4}\right\}$.

203. $\left\{\frac{2d}{3a^3b^2c}+\frac{3a^2}{4b^3c^2d}-\frac{2b^2}{5a^2c^3d}\right\}+\left\{\frac{5d^3}{9a^3bc^2}-\frac{7d^2}{12ab^3c^2}-\frac{5c^3}{12ab^2d^3}\right\}+\left\{\frac{5a^4}{b^3c^2d}-\frac{3d}{20abc^2}-\frac{7b}{ac^2d^3}\right\}$.

204. $\left\{\frac{2a+b}{a-b}+\frac{a-2b}{a+b}+\frac{a+b}{a^3-b^3}\right\}+\left\{\frac{2a+b}{a^2-b^2}+\frac{a-2b}{a^4-b^4}+\frac{a+b}{a-b}\right\}$.

205. $\left\{\frac{a+b}{a^3-b^3}+\frac{2ab}{a^2-b^2}-\frac{b^2}{a+b}\right\}+\left\{\frac{3b}{a^2+b^2}+\frac{2a}{a^2-b^2}-\frac{ab}{a+b}\right\}$.

206. $\left\{\frac{a^2b}{2a+b}-\frac{ab^2}{2a-b}\right\}+\left\{\frac{ab}{a+2b}-\frac{b^2}{a-2b}\right\}+\left\{\frac{2a}{a+b}+\frac{3b}{a^3-b^3}\right\}$.

ARTICULO II.

Resta.

207. $\left\{\frac{2a}{3b}+\frac{3b}{2a^2}\right\}-\frac{5c}{6a^2b^2}$. **208.** $\left\{\frac{5a}{6b^2}+\frac{3b}{8a^2}\right\}-\left\{\frac{5c}{12ab}-\frac{2a}{9b}\right\}$.

209. $\left\{\frac{a}{8b}+\frac{b}{6ac}+\frac{c}{9a^2bc}\right\}-\left\{\frac{3a}{5b^2c}+\frac{2b}{15a^2c}+\frac{7d}{10bc^2}\right\}$.

210. $\left\{\frac{a}{a+b}-\frac{b}{a-b}\right\}-\left\{\frac{a^2}{a^2+b^2}-\frac{b^2}{a^2-b^2}\right\}$.

211. $\left\{\frac{a+b}{a-b}-\frac{a-b}{a+b}\right\}-\left\{\frac{a+b}{a^2-b^2}-\frac{a^2-b^2}{a+b}\right\}$.

212. $\left\{\frac{a+b}{8(a-b)}-\frac{a-b}{6(a+b)}\right\}-\left\{\frac{5ab}{12(a^2-b^2)}-\frac{5a}{9(a+b)^2}\right\}$.

213. $\left\{\frac{3a+2b}{2a-3b}-\frac{2a+3b}{3a-2b}\right\}-\left\{\frac{a+b}{9a^2-4b^2}-\frac{a-b}{4a^2-9b^2}\right\}$.

214. $\left\{\frac{a+3b}{a+b}-\frac{3a+b}{(a+b)^2}\right\}-\left\{\frac{2a-b}{a+b}-\frac{a-2b}{(a+b)^3}\right\}$.

215. $\left\{\frac{a^2}{a+b}+\frac{b^2}{b+c}-\frac{c^2}{a+c}\right\}-\left\{\frac{a^2}{a-b}+\frac{b^2}{b-c}-\frac{c^2}{a-c}\right\}$.

216. $\dfrac{\dfrac{a+b}{2a}+\dfrac{a-b}{2b}}{\dfrac{a-b}{a^2+b^2}-\dfrac{a+b}{a^3-b^3}} - \dfrac{\dfrac{a-b}{a^3-b^3}-\dfrac{a+b}{a^2+b^2}}{\dfrac{2a}{a+b}-\dfrac{2b}{a-b}}$.

ARTICULO III.

Multiplicacion.

217. $\frac{a^2+b}{a^2-b}\times\frac{a^2-b}{a^2+b}$ **218.** $\frac{2a+b}{2a-b}\times\frac{a+2b}{a-2b}$.

219. $\frac{a+b}{(a-b)^2}\times\frac{a-b}{(a+b)^2}$. **220.** $\frac{8a^2+5b^2}{3a+7b}\times\frac{2a^3-3b^3}{a^2+b^2}$.

221. $\frac{(a+b)^2}{(a-b)^3} \times \frac{(a+c)^3}{(a-c)^2}$. **222.** $\frac{a^2+2}{a^3-1} \times \frac{a^3+2}{a^2+1}$.

223. $\frac{\frac{a+b}{a-b} \times \frac{a^2+b^2}{a^2-b^2}}{\frac{a^2+b^2}{a-b} \times \frac{a+b}{a^2-b^2}} \times \frac{(a+b)^2}{(a-b)^3}$.

224. $\frac{\frac{a+b}{(a-b)^3} \times \frac{a^2-b^2}{(a^2+b^2)^2}}{\frac{a+5}{(a-5)^2} \times \frac{(5-a)^2}{(5+a)^3}} \times \frac{\frac{a+5}{a-5} \times \frac{5+a}{5-a}}{\left\{\frac{a+5}{a-5}\right\}^4}$.

225. $\frac{\frac{a+x^2}{a^2+x} \times \frac{a+x}{a-x}}{\frac{x+2a}{x-2a} \times \frac{x-a}{x+a}} \times \frac{\frac{a^2+x^2}{a^2-x^2} \times \frac{a+x}{a-x}}{\frac{a^2-x^2}{a^2} \times \frac{a^2+x^2}{x^2}}$.

226. $\frac{(9x^2-30ax+25a^2)\,(a^2+ab+b^2)}{(a^3-b^3)\,(a+b)} \times \frac{(9x^2+30ax+25a^2)\,(a^2+2ab+b^2)\,(a^2-b^2)}{9x^2-25a^2}$.

ARTICULO IV.

Division.

227. $\frac{357a^9b^7c^{11}}{306d^9f^7g^6} : \frac{561d^{17}f^{12}g^{11}}{21a^2b^3c^4}$. **228.** $\frac{275a^{11}b^8c^5}{319df^2g^3} : \frac{609a^2b^3c^4}{1218d^6f^7g^8}$.

229. $\frac{4199ab^7c^{13}}{667m^5p^6q} : \frac{19b^6c^5}{1334m^8p^9q^3}$. **230.** $\frac{5a^6b^4d^8}{21c^5d^{11}f^6} : \frac{5a^3d^8}{9d^5f^6}$.

231. $\frac{437a^{2m}b^{3n}c^{4q}}{493d^r f^{2s} g^{3t}} : \frac{25a^m b^{2n} c^{3q}}{986d^{6r} f^{5s} g^{4t}}$. **232** $\frac{3,2a^7b^3c^9}{\frac{3}{4}f^9g^6} : \frac{8af^5d^4}{0,72g^8m^7}$

233. $\left\{\frac{7a^{10}b^4c^6x^5}{15b^2d^7f^2y^3} + \frac{49a^{17}g^8x^5}{99b^2x^3y^5}\right\} : \frac{7a^8x^5}{9b^2y^3}$.

234. $\left\{\frac{6a^4y^5}{0,1b^5c^3} - \frac{3,5x^4y^6}{1,4ab^6c^3} - \frac{21a^5x^5y^3}{0,2b^4c^3}\right\} : \frac{5ax^2y^3}{0,2b^4c}$.

235. $\left\{\frac{a^3x^3}{b^3y^3} + \frac{10a^4x}{21y^2} - \frac{24a^3}{55b^4} - \frac{16a^4y}{77bx^2}\right\} : \left\{\frac{5ax^2}{3b^2y} - \frac{8ay^2}{11b^3x}\right\}$.

236. $\left\{\frac{2,1a^3}{b^2}-\frac{0,56a^2by}{x^3}-\frac{6,75ax^2}{b^4y}+\frac{1,8}{bx}\right\}:\left\{\frac{7ay^2}{5bx}-\frac{9xy}{2ab^3}\right\}.$

ARTICULO V.

Combinacion de las operaciones anteriores.

237. $$\frac{\frac{2a}{a+b}\times\frac{2b}{a-b}}{\frac{a+b}{a^3-b^3}\times\frac{a-b}{a^2+b^2}}-\frac{\frac{ab}{a+b}\times\frac{a-b}{2a+b}}{\frac{2a-b}{2a+b}\times\frac{a^2+b^2}{a^3-b^3}}.$$

238. $$\frac{\frac{a+2}{a^2-b^2}\times\frac{a+b}{a^3-b^3}}{\frac{a-2}{a+b}\times\frac{ab}{a-b}}-\frac{\frac{2-a}{a-b}\times\frac{a^3-b^3}{a+b}}{\frac{ab}{a^2-b^2}}.$$

239. $$\frac{\frac{a+2}{a^2-b^2}\times\frac{a+b}{a^3-b^3}}{\frac{a-2}{a+b}\times\frac{ab}{a-b}}-\frac{\frac{2-a}{a-b}\times\frac{a^3-b^3}{a+b}}{\frac{2a(a^3-b^3)}{a^2-b^2}}.$$

240. $$\frac{\frac{a^3-b^3}{a^3+b^3}:\frac{a^2+b^2}{a^2-b^2}}{\frac{a^2+2ab+b^2}{a^2-2ab+b^2}:\frac{a^3-3a^2b+3ab^2-b^3}{a^3+3a^2b+3ab^2+b^3}}\times\frac{\frac{a+b}{a-b}:\frac{a-b}{a+b}}{\frac{a^2+b^2}{a^2-b^2}:\frac{a^3-b^3}{a^3+b^3}}.$$

241. $$\frac{\frac{a^3-b^3}{a+b}\times\frac{a^2+b^2}{a-b}}{\frac{a+b}{2a}\times\frac{a-b}{2b}}:\frac{\frac{2a}{a+b}\times\frac{2b}{a-b}}{\frac{a^2+b^2}{a-b}\times\frac{a^3-b^3}{a+b}}.$$

242. $$\left\{\left\{\frac{a-b}{a+b}:\frac{a^2+b^2}{b^2+c^2}\right\}\left\{\frac{b-c}{b+c}:\frac{a-b}{a^2+b^2}\right\}\right\}:\left\{\left\{\frac{b+c}{a-c}:\frac{b-c}{a+c}\right\}\left\{\frac{a^2+b^2}{b^2+c^2}:\frac{a^2-b^2}{b^2-c^2}\right\}\right\}.$$

243. $$\frac{\frac{(a+b)^2}{a^2+b^2}\times\frac{a^2-b^2}{(a-b)^2}}{\frac{a^2+b^2}{a^2-b^2}\times\frac{a+b}{a-b}}\cdot\frac{\frac{a^2+c^2}{a^2+b^2}\times\frac{a^2-b^2}{a^2-c^2}}{\left\{\frac{a+b}{a-c}\right\}2:\left\{\frac{a+c}{a-b}\right\}2}.$$

244. $$\frac{\frac{a+3}{a-3}+\frac{a+2}{a-2}}{\frac{3+a}{3-a}-\frac{2-a}{3+a}}\cdot\frac{\frac{a+5}{5-a}-\frac{a+3}{5+a}}{\frac{4-a}{4+a}-\frac{a-4}{a+4}}.$$

CAPITULO IV.

ELEVACION A POTENCIAS Y EXTRACCION DE RAICES.

ARTICULO I.

Elevacion á potencias.

§. I. CUADRADOS.

245. $\{2ab^2c^3 - a^3bc^2\}^2$. **246.** $\{13ax^2 + 7a^2x\}^2$.

247. $\{3a^3b^4c^3x^2 - 7a^2b^3c^4x^3\}^2$.

248. $\{2ab^2x^3 + 0,2a^3b^2x\}^2$.

249. $\{2,5a^2x^3 + 5,2a^3x^2\}^2$.

250. $\{5a^3x^4 + 4a^4x^3 + 3a^3x^2\}^2$.

251. $\{3a^2b^2c - 5ab^3c^2 + 2a^3b^2c^2\}^2$.

252. $\{3a^3b^2x - 2a^2bx^3 + 5ab^3x^2\}^2$.

253. $\{0,2xy^2z^3 - 0,3x^2y^3z + 0,5x^3yz^2\}^2$.

254. $\{2,3a^3b^2c - 2,4a^2bc^3 - 3,4ab^3c^2\}^2$.

255. $\{3a^7x^2+\frac{3}{4}a^5x^3+\frac{7}{9}a^3x^4+\frac{5}{11}ax^5\}^2$.

256. $\{2,3ax^5-\frac{2}{5}a^3x^7+3,2a^5x^9-\frac{7}{9}a^7x^{11}\}^2$.

§ II.—CUBOS.

257. $\{2ab^2c^3+a^3bc^2\}^3$. **258.** $\{13ax^2+7a^2x\}^3$.

259. $\{3a^5b^4c^3x^2-7a^2b^3c^4x^5\}^3$.

260. $\{2ab^2x^3+0,2a^3b^2x\}^3$.

261. $\{2,5a^2x^3+5,2a^3x^2\}^3$.

262. $\{5a^5x^4+4a^4x^3+3a^3x^2\}^3$.

263. $\{3a^2b^2c-5ab^3c^2+2a^3b^2c^2\}^3$.

264. $\{3a^3b^2x-2a^2bx^3+5ab^3x^2\}^3$.

265. $\{0,2xy^2z^3-0,3x^2y^3z+0,5x^3yz^2\}^3$.

266. $\{2,3a^3b^2c-2,4a^2bc^3-3,4ab^3c^2\}^3$.

§ III.—CUARTAS POTENCIAS.

267. $\{2ab^2c^3+a^3bc^2\}^4$. **268.** $\{13ax^2+7a^2x\}^4$.

269. $\{3a^5b^4c^3x^2-7a^2b^3c^4x^5\}^4$.

270. $\{2ab^2x^3+0,2a^3b^2x\}^4$.

271. $\{2,5a^2x^3+5,2a^3x^2\}^4$.

272. $\{3a^2b^2c-5ab^3c^2+2a^3b^2c^2\}^4$.

273. $\{3a^3b^2x-2a^2bx^3+5ab^3x^2\}^4$.

274. $\{0,2xy^2z^3-0,3x^2y^3z+0,5x^3yz^2\}^4$.

275. $\{2,3a^3b^2c-2,4a^2bc^3-3,4ab^3c^2\}^4$.

276. $\left\{2a^4x+\frac{3}{5}a^3x^2-0,5a^2x^3-3,2ax^4\right\}^4$.

§ IV.—QUINTAS POTENCIAS.

277. $\{3a^3b^4c^3x^2-7a^2b^3c^4x^3\}^5$. **278.** $\{13ax^2+7a^2x\}^5$.

279. $\{2ab^2x^3+0,2a^3b^2x\}^5$.

280. $\{2,5a^2x^3+5,2a^3x^2\}^5$.

281. $\left\{0,2a^7x^3y^3-\frac{5a^3x^4}{2y^3}\right\}^5$.

282. $\{2ab^2c^3+3a^2b^3c+a^3bc^2\}^5$.

283. $\{3a^2b^2c-5ab^3c^2+2a^3b^2c^2\}^5$.

284. $\{3a^3b^2x-2a^2bx^3+5ab^3x^2\}^5$.

285. $\{0,2xy^2z^3-0,3x^2y^3z+0,5x^3yz^2\}^5$

286. $\{2,3a^3b^2c-2,4a^2bc^3-3,4ab^3c^2\}^5$.

287. $\{5a^3x^4+4a^4x^3+3a^3x^2+2a^2x\}^5$.

§ V.—SEXTAS POTENCIAS.

288. $\{3a^2b^3c+5a^4b^3c^2\}^6$.

289. $\{7a^3b^4c^3x^2+4a^2b^3c^4x^3\}^6$.

290. $\{2a^3b^2x+0,2ab^2x^3\}^6$.

291. $\{2,5a^7b^6x^3-1,3a^6b^7x^8\}^6$.

292. $\{3a^5x^2-5a^4x^3+9a^3x^4\}^6$.

293. $\left\{7ax^2-\frac{3}{4}a^2x^3+0,5a^3x^4\right\}^6$.

294. $\left\{\frac{2}{3}a^7x^5-\frac{3}{5}a^6x^3-\frac{7}{9}a^2x^7\right\}^6$.

295. $\{0,5xy^3-3,2x^3y-1,5x^2y^2\}^6$.

296. $\{3x^3y^2-5x^2y^3+2x^2y^2-7x^3y^3\}^6$.

297. $\left\{3x^4y^3-0,2x^3y^4+2,5x^3y^3-\frac{3}{4}x^4y^4\right\}^6$.

§ VI.—SÉPTIMAS POTENCIAS.

298. $\{2xy^3-3x^2y\}^7$. **299.** $\{7a^4b^3x^2-5a^2b^3x\}^7$.

300. $\left\{\frac{2}{3}ab^3c^6-\frac{3}{2}a^6b^3c\right\}^7$. **301.** $\left\{\frac{3}{4}x^2y^3-0,5x^3y^2\right\}^7$.

302. $\{3x^4y^3-2,5x^7y^3\}^7$. **303.** $\{3,2a^2x^3-0,5x^3y^4\}^7$.

304. $\left\{3a^2x^4-0,5x^2y^3+\frac{3}{5}a^3y^2\right\}^7$.

305. $\{0,2a^3x^2+0,03x^4y^3-0,003x^4y^3\}^7$.

306. $\{2a^3b^2x-3a^2bx^3-5ab^3x^2-7a^4b^4\}^7$.

307. $\{2,3a^mx^4-0,2a^4x^m+0,5a^3x^2+2,2a^mx^m\}^7$.

ARTICULO II.

Extraccion de raices.

§ I.—RAIZ CUADRADA.

308. $\sqrt{\{529a^{14}x^{10}+2209a^{10}x^{14}+2162a^{12}x^{12}\}}$.

309. $\sqrt{\{6,25a^8x^2+10,24a^2x^8-16a^5x^5\}}$.

310. $\sqrt{\{\frac{169}{289}x^{18}y^{12}+\frac{289}{169}x^{12}y^{18}-2x^{15}y^{15}\}}$.

311. $\sqrt{\{841a^{14}x^6+961a^{12}x^8+289a^{10}x^{10}+1798a^{13}x^7+986a^{12}x^8+1054a^{11}x^9\}}$.

312. $\sqrt{\{7,29a^6x^4+10,24a^4x^6+10,89a^2x^8+17,28a^5x^5+17,82a^4x^6+21,12a^3x^7\}}$.

313. $\sqrt{\{\frac{1369}{5329}a^{10}x^8y^6+\frac{625}{2704}a^8x^8y^8+\frac{676}{3844}a^6x^8y^{10}-\frac{925}{1898}a^9x^8y^7-\frac{962}{2263}a^8x^8y^8+\frac{25}{62}a^7x^8y^9\}}$.

314. $\sqrt{\{1521a^{10}x^2+1369a^8x^4+961a^6x^6+841a^4x^8-2886a^9x^3+2418a^8x^4-2262a^7x^5-2294a^7x^5+2146a^6x^6-1798a^5x^7\}}$.

315. $\sqrt{\{5,4756a^{14}x^6y^2+10,5625a^{10}x^{12}y^{14}+90,25a^6x^4y^{10}+5,0625a^2x^{10}y^{12}-15,21a^{12}x^9y^8+44,46a^{10}x^5y^6-10,53a^8x^8y^7-61,75a^8x^8y^{12}+14,625a^6x^{11}y^{13}-42,75a^4x^7y^{11}\}}$.

316. $\sqrt{\{\frac{54756}{323761}a^4b^8+\frac{15129}{208849}a^6x^4+\frac{53361}{103684}x^8y^6+\frac{16129}{16384}a^{10}x^6y^{10}+\frac{57564}{260033}a^5b^4x^2+\frac{108108}{183218}a^2b^4x^4y^3+\frac{59436}{72832}a^7b^4x^3y^5+\frac{28413}{73877}a^3x^6y^3+\frac{15621}{29248}a^8x^5y^5+\frac{29337}{20608}a^5x^7y^8\}}$.

317. $\sqrt{\{2500a^4x^6+625a^6x^4+\frac{4}{25}a^2x^8+0,25a^8x^2+64x^{10}+2500a^5x^5+40a^3x^7+50a^6x^4+800a^2x^8+20a^4x^6+25a^7x^3+400a^3x^7+\frac{2}{5}a^5x^5+\frac{32}{5}ax^9+8a^4x^6\}}$.

§. II.—RAIZ CÚBICA.

318. $\sqrt[3]{\{12167a^{21}x^9+26979a^{19}x^{11}+19941a^{17}x^{13}+4913a^{15}x^{15}\}}$.

319. $\sqrt[3]{78732x^{14}y^{19} - 354294x^{13}y^{20} - 5832x^{15}y^{18} + 531441x^{12}y^{21}}$.

320. $\sqrt[3]{76,545\,x^{17}y^{9}z^{22} - 19,683x^{12}y^{9}z^{27} - 99,225x^{22}y^{9}z^{17} + 42,875x^{27}y^{9}z^{12}}$.

321. $\sqrt[3]{\frac{148877}{377933067}a^{24}b^{12}c^{9} + \frac{4913}{12167}a^{27}x^{12}y^{9} + \frac{47753}{4007589}a^{25}b^{8}c^{6}x^{4}y^{3} + \frac{13317}{127489}a^{26}b^{4}c^{3}x^{8}y^{6}}$.

322. $\sqrt[3]{12167a^{9}x^{6}y^{3} + 175616a^{6}x^{3}y^{9} + 15625a^{3}x^{9}y^{6} + 88872a^{8}x^{5}y^{5} + 39675a^{7}x^{7}y^{4} + 235200a^{5}x^{5}y^{8} + 216384a^{7}x^{4}y^{7} + 43125a^{5}x^{8}y^{5} + 105000a^{4}x^{7}y^{7} + 193200a^{6}x^{6}y^{6}}$.

323. $\sqrt[3]{143,055667a^{24}b^{15}x^{9} + 16,194277a^{15}b^{9}x^{24} + 10,648a^{9}b^{24}x^{15} + 207,608511a^{21}b^{13}x^{14} + 180,52914a^{19}b^{18}x^{11} + 42,24594a^{13}b^{14}x^{21} + 100,430121a^{18}b^{11}x^{19} + 75,9396a^{14}b^{21}x^{13} + 36,7356a^{11}b^{19}x^{18} + 174,66108a^{16}b^{16}x^{16}}$.

324. $\sqrt[3]{0,17250a^{15}b^{15}c^{15} + 0,09375a^{11}b^{17}c^{17} + 0,043125a^{15}b^{19}c^{15} + 0,1725a^{17}b^{11}c^{17} + 0,1875a^{15}b^{15}c^{19} + 0,039675a^{17}b^{17}c^{11} + 0,07935a^{19}b^{15}c^{15} + 0,015625a^{9}b^{21}c^{15} + 0,125a^{15}b^{9}c^{21} + 0,012167a^{21}b^{15}c^{9}}$.

325. $\sqrt[3]{\frac{12167a^{21}x^{15}}{1367631b^{12}y^{9}} + \frac{4913a^{12}x^{9}}{6859b^{15}y^{6}} + \frac{1331a^{6}x^{21}}{2197b^{6}y^{18}} + \frac{26979a^{18}x^{13}}{234099b^{13}y^{8}} + \frac{17457a^{16}x^{17}}{160173b^{10}y^{12}} + \frac{9537a^{10}x^{18}}{4693b^{12}y^{10}} + \frac{19941a^{15}x^{11}}{40071b^{14}y^{7}} + \frac{83493a^{11}x^{19}}{18759b^{8}y^{13}} + \frac{6171a^{8}x^{17}}{3211b^{9}y^{14}} + \frac{25806a^{13}x^{15}}{27417b^{11}y^{11}}}$.

326. $\sqrt[5]{64a^6b^5x^9+8a^9x^9+225a^7b^7x^4+144a^5b^5x^8+54a^5b^6x^7+135a^5b^8x^5+108a^4b^7x^7+36a^7b^5x^8+240a^8b^5x^7+144a^6b^4x^8+125a^9b^6x^5+27a^5b^9x^6+300a^8b^5x^5+150a^9b^4x^5+96a^7b^2x^9+240a^7b^4x^7+60a^9b^2x^7+48a^8bx^9+360a^6b^6x^6+180a^7b^5x^6}$.

327. $\sqrt[5]{343a^{15}b^{12}c^9x^6+125a^9b^6c^5x^{24}+882a^{14}b^{11}c^8x^9+540a^{11}b^8c^5x^{18}+300a^8b^5c^5x^{24}+756a^{13}b^{10}c^7x^{12}+450a^{10}b^7c^4x^{21}+240a^7b^4c^7x^{24}+1260a^{12}b^9c^6x^{15}+1008a^{11}b^8c^8x^{15}+288a^8b^5c^8x^{21}+525a^{11}b^8c^5x^{18}+432a^{10}b^7c^7x^{18}+735a^{13}b^{10}c^7x^{12}+588a^{12}b^9c^9x^{12}+336a^9b^6c^9x^{18}+840a^{10}b^7c^7x^{18}+720a^9b^6c^6x^{21}+216a^{12}b^9c^6x^{15}+64a^6b^5c^9x^{24}}$.

§ III.—RAIZ CUARTA.

328. $\sqrt[4]{6907974a^{16}x^{20}+3609572a^{18}x^{18}+5875748a^{14}x^{22}+1874161a^{12}x^{24}+707281a^{20}x^{16}}$.

329. $\sqrt[4]{-10130600a^{25}b^{22}x^{17}+6250000a^{16}b^{28}x^{20}-18500000a^{19}b^{26}x^{19}+1874161a^{28}b^{20}x^{16}+20535000a^{22}b^{24}x^{18}}$.

330. $\sqrt[4]{1456x^{20}y^{16}+81x^{16}y^{20}+256x^{24}y^{12}+960x^{19}y^{17}+1280x^{21}y^{15}+648x^{18}y^{18}+1152x^{22}y^{14}+216x^{17}y^{19}+512x^{23}y^{13}}$.

331. $\sqrt[4]{625a^{20}x^{16}+4486a^{16}x^{12}+81a^{12}x^8+2000a^{19}x^{15}+3900a^{18}x^{14}+2928a^{15}x^{11}+1404a^{14}x^{10}+4880a^{17}x^{13}+432a^{13}x^9}$.

332. $\sqrt[4]{\{456976a^{20}b^{16}c^{12} + 194481a^{16}b^{12}x^8 + 65536a^{12}b^8c^4 + 1476384a^{19}b^{15}c^9x^2 + 1124864a^{18}b^{14}c^{10} + 592704a^{15}b^{11}cx^6 + 1788696a^{18}b^{14}c^6x^4 + 1038336a^{16}b^{12}c^8 + 677376a^{14}b^{10}c^2x^4 + 963144a^{17}b^{13}c^3x^6 + 425984a^{14}b^{10}c^6 + 344064a^{13}b^9c^3x^2 + 2725632a^{17}b^{13}c^7x^2 + 2201472a^{16}b^{12}c^4x^4 + 1677312a^{15}b^{11}c^5x^2\}}$.

333. $\sqrt[4]{\{0,0625a^{20}x^{16} + 0,06a^{18}x^{18} + 0,0016a^{16}x^{20} - \frac{1}{10}a^{19}x^{17} - 0,016a^{17}x^{19}\}}$.

334. $\sqrt[4]{\{- 428,75a^{38}x^{22} - 218,75a^{34}x^{26} + 150,0625a^{40}x^{20} + 459,375a^{36}x^{24} + 39,0625a^{32}x^{28}\}}$.

335. $\sqrt[4]{\{\frac{194481a^{28}b^{20}}{456976c^{16}d^{12}} + \frac{441a^{26}b^{11}}{169c^8d^{14}} + \frac{6a^{24}b^2c^6}{d^{16}} + \frac{2704a^{22}c^{17}}{441b^7d^{18}} + \frac{456976a^{20}c^{28}}{194481b^{16}d^{20}}\}}$.

336. $\sqrt[4]{\{\frac{50625a^{12}x^8}{65536b^{16}y^{12}} + \frac{225a^{11}x^4}{64b^{13}y^6} + \frac{6a^{10}}{b^{14}} + \frac{1024a^9y^6}{225b^{13}x^4} + \frac{65536a^8y^{12}}{50625b^{12}x^8}\}}$.

337. $\sqrt[4]{\{\frac{279841a^{24}x^{16}}{331776b^{12}y^8} + \frac{331776a^{12}y^8}{390625b^{16}x^{12}} + \frac{279841x^{16}y^{12}}{390625a^{20}b^{16}} + \frac{12167a^{21}x^9}{3600b^{13}y^4} + \frac{279841a^{13}x^{16}}{86400b^{13}y^3} + \frac{1271808a^4y^9}{390625b^{16}x^5} + \frac{3174a^{18}x^2}{625b^{14}} + \frac{279841a^2x^{16}y^2}{60000b^{14}} + \frac{1828224x^2y^{10}}{390625a^4b^{16}} + \frac{52992a^{15}y^4}{15625b^{15}x^5} + \frac{279841x^{16}y^7}{93750a^9b^{15}} + \frac{1168032x^9y^{11}}{390625a^{12}b^{16}} + \frac{12167a^{10}x^9y}{1250b^{14}} + \frac{152352a^7x^2y^5}{15625b^{15}} + \frac{146004x^9y^6}{15625ab^{15}}\}}$.

§ IV.—RAIZ QUINTA.

338. $\sqrt[5]{\{3125a^{25}x^{20} + 12500a^{24}x^{19} + 20000a^{23}x^{18} + 16000a^{22}x^{17} + 6400a^{21}x^{16} + 1024a^{20}x^{15}\}}$.

339. $\sqrt[5]{\{32a^{5}b^{10}c^{15}+80a^{7}b^{9}c^{14}+80a^{9}b^{8}c^{13}+40a^{11}b^{7}c^{12}+10a^{13}b^{6}c^{11}+a^{15}b^{5}c^{10}\}}$.

340. $\sqrt[5]{\{a^{35}x^{20}+5a^{33}x^{22}+10a^{31}x^{24}+10a^{29}x^{26}+5a^{27}x^{28}+a^{25}x^{30}\}}$.

341. $\sqrt[5]{\{16807a^{45}x^{25}-108045a^{43}x^{27}+277830a^{41}x^{29}-357210a^{39}x^{31}+229635a^{37}x^{33}-59049a^{35}x^{35}\}}$.

342. $\sqrt[5]{\{166957a^{15}x^{25}+181525a^{16}x^{24}+138250a^{17}x^{23}+70625a^{18}x^{22}+21875a^{19}x^{21}+3125a^{20}x^{20}+108915a^{14}x^{26}+49770a^{13}x^{27}+15255a^{12}x^{28}+2835a^{11}x^{29}+243a^{10}x^{30}\}}$.

343. $\sqrt[5]{\{243a^{35}x^{25}y^{15}+810a^{33}x^{23}y^{19}+1080a^{31}x^{21}y^{23}+720a^{29}x^{19}y^{27}+240a^{27}x^{17}y^{31}+32a^{25}x^{15}y^{35}+405a^{31}x^{27}y^{17}+1080a^{29}x^{25}y^{21}+1080a^{27}x^{23}y^{25}+480a^{25}x^{21}y^{29}+80a^{23}x^{19}y^{33}+270a^{27}x^{29}y^{19}+540a^{25}x^{27}y^{23}+360a^{23}x^{25}y^{27}+80a^{21}x^{23}y^{31}+90a^{23}x^{31}y^{21}+120a^{21}x^{29}y^{25}+40a^{19}x^{27}y^{29}+15a^{19}x^{33}y^{23}+10a^{17}x^{31}y^{27}+a^{15}x^{33}y^{25}\}}$.

344. $\sqrt[5]{\{0,00001a^{25}x^{15}-0,0001a^{22}x^{18}+0,0004a^{19}x^{21}-0,0008a^{16}x^{24}+0,0008a^{13}x^{27}-0,00032a^{10}x^{30}\}}$.

345. $\sqrt[5]{\{0,00243a^{25}x^{10}+0,02025a^{24}x^{9}+0,0675a^{23}x^{8}+0,1125a^{22}x^{7}+0,09375a^{21}x^{6}+0,03125a^{20}x^{5}\}}$.

346. $\sqrt[5]{\{\frac{243}{1024}x^{15}y^{20}-\frac{135}{64}x^{16}y^{19}+\frac{30}{4}x^{17}y^{18}-\frac{40}{3}x^{18}y^{17}+\frac{320}{27}x^{19}y^{16}-\frac{1024}{243}x^{20}y^{15}\}}$.

347. $\sqrt[5]{\left\{\frac{1024a^{15}b^{10}}{3125x^{20}y^{15}} - \frac{256a^{14}b^{5}}{75x^{13}y^{16}} + \frac{128a^{13}}{9x^{6}y^{17}} - \frac{800a^{12}x}{27b^{5}y^{18}} + \frac{2500a^{11}x^{8}}{81b^{10}y^{19}} - \frac{3125a^{10}x^{15}}{243b^{15}y^{20}}\right\}}$.

§. V.—RAIZ SEXTA.

348. $\sqrt[6]{\{a^{30}x^{24} - 6a^{29}x^{25} + 15a^{28}x^{26} - 20a^{27}x^{27} + 15a^{26}x^{28} - 6a^{25}x^{29} + a^{24}x^{30}\}}$.

349. $\sqrt[6]{\{64a^{24}x^{18} + 192a^{20}bx^{15}y + 240a^{16}b^{2}x^{12}y^{2} + 160a^{12}b^{3}x^{9}y^{3} + 60a^{8}b^{4}x^{6}y^{4} + 12a^{4}b^{5}x^{3}y^{5} + b^{6}y^{6}\}}$.

350. $\sqrt[6]{\{64a^{42}x^{36} - 576a^{41}x^{37} + 2160a^{40}x^{38} - 4320a^{39}x^{39} + 4860a^{38}x^{40} - 2916a^{37}x^{41} + 729a^{36}x^{42}\}}$.

351. $\sqrt[6]{\{729a^{34}x^{30} - 7290a^{32}x^{25}y^{7} + 30375a^{30}x^{20}y^{14} - 67500a^{48}x^{15}y^{21} + 84375a^{46}x^{10}y^{28} - 56250a^{44}x^{5}y^{35} + 15625a^{42}y^{42}\}}$.

352. $\sqrt[6]{\{729a^{42}b^{36}x^{30} + 5832a^{41}b^{35}x^{29} + 29646a^{40}b^{34}x^{28} + 102600a^{39}b^{33}x^{27} + 275535a^{38}b^{32}x^{26} + 577872a^{37}b^{31}x^{25} + 985636a^{36}b^{30}x^{24} + 1348368a^{35}b^{29}x^{23} + 1500135a^{34}b^{28}x^{22} + 1303400a^{33}b^{27}x^{21} + 878766a^{32}b^{26}x^{20} + 403368a^{31}b^{25}x^{19} + 117649a^{30}b^{24}x^{18}\}}$.

353. $\sqrt[6]{\{64a^{30}x^{24}y^{18} + 576a^{29}x^{23}y^{20} + 2160a^{28}x^{22}y^{22} + 4320a^{27}x^{21}y^{24} + 4860a^{26}x^{20}y^{26} + 2916a^{25}x^{19}y^{28} + 729a^{24}x^{18}y^{30} + 1152a^{28}x^{25}y^{19} + 8640a^{27}x^{24}y^{21} + 25920a^{26}x^{23}y^{23} + 38880a^{25}x^{22}y^{25} + 29160a^{24}x^{21}y^{27} + 8748a^{23}x^{20}y^{29} + 8640a^{26}x^{26}y^{20} + 51840a^{25}x^{25}y^{22} + 116640a^{24}x^{24}y^{24} + 116640a^{23}x^{23}y^{26} + 43740a^{22}x^{22}y^{28} + 34560a^{24}x^{27}y^{21} + 155520a^{23}x^{26}y^{25} + 233280a^{22}x^{25}y^{25} + 116640a^{21}x^{24}y^{27} + 77760a^{22}x^{28}y^{22} + 233280a^{21}x^{27}y^{24} + 174960a^{20}x^{26}y^{26} + 93312a^{20}x^{29}y^{23} + 139968a^{19}x^{28}y^{25} + 46656a^{18}x^{30}y^{24}\}$.

354. $\sqrt[6]{\{0{,}015625a^{36}x^{24} + 0{,}0375a^{34}x^{26} + 0{,}0375a^{32}x^{28} + 0{,}02a^{30}x^{30} + 0{,}006a^{28}x^{32} + 0{,}00096a^{26}x^{34} + 0{,}000064a^{24}x^{36}\}$.

355. $\sqrt[6]{\{38{,}4a^{8}x^{11}y^{17} + 9{,}6a^{10}x^{10}y^{16} + 64a^{6}x^{12}y^{18} + 1{,}28a^{12}x^{9}y^{15} + 0{,}096a^{14}x^{8}y^{14} + 0{,}00384a^{16}x^{7}y^{13} + 0{,}000064a^{18}x^{6}y^{12}\}$.

356. $\sqrt[6]{\left\{\frac{117649a^{36}x^{18}}{531441b^{12}y^{6}} + \frac{4802a^{24}x^{12}}{2187b^{8}y^{4}} + \frac{245a^{12}x^{6}}{27b^{4}y^{2}} + \frac{1215b^{4}y^{2}}{49a^{12}x^{6}} + \frac{59366b^{8}y^{4}}{2401a^{24}x^{12}} + \frac{531441b^{12}y^{6}}{117649a^{36}x^{18}} + 20\right\}}$.

357. $\sqrt[6]{\left\{\frac{1771561a^{30}x^{24}}{4826809b^{24}y^{18}} - \frac{6764142a^{25}c^{2}dx^{17}}{6311981b^{20}y^{19}} + \frac{10761135a^{20}c^{4}d^{2}x^{10}}{8254129b^{16}y^{20}} - \frac{9150630a^{15}c^{6}d^{3}x^{3}}{10795861b^{12}y^{21}} + \frac{4557815a^{10}c^{8}d^{4}}{14115049b^{8}x^{4}y^{22}} - \frac{1109262a^{5}c^{10}d^{5}}{18458141b^{4}x^{11}y^{23}} + \frac{117649c^{12}d^{6}}{24137569x^{18}y^{24}}\right\}}$.

§ VI.—RAIZ SÉPTIMA.

358. $\sqrt[7]{\{3073280x^9y^{15}b^{12}z^8 + 3294172x^{18}y^{30}b^3z^2 + 1053696x^6y^{10}b^{15}z^{10} + 16384b^{21}z^{14} + 200704x^3y^5b^{18}z^{12} + 823543x^{21}y^{35} + 5378240x^{12}y^{20}b^9z^6 + 5647152x^{15}y^{25}b^6z^4\}}$.

359. $\sqrt[7]{\{2187a^{35}b^{14} + 2551,5a^{30}b^{12}c^2d^5 + 1275,75a^{25}b^{10}c^4d^{10} + 354,375a^{20}b^8c^6d^{15} + 59,0625a^{15}b^6c^8d^{20} + 5,90625a^{10}b^4c^{10}d^{25} + 0,328125a^5b^2c^{12}d^{30} + 0,0078125c^{14}d^{35}\}}$.

360. $\sqrt[7]{\{78125a^{21}x^{14} - 54687,5a^{18}x^{12}y^2z^3 + 16406,25a^{15}x^{10}y^4z^6 - 2734,375a^{12}x^8y^6z^9 + 273,4375a^9x^6y^8z^{12} - 16,40625a^6x^4y^{10}z^{15} + 0,546875a^3x^2y^{12}z^{18} - 0,0078125y^{14}z^{21}\}}$.

361. $\sqrt[7]{\{567a^5x^{15}b^4y^4 - 1701a^6x^{18}b^2y^2 - 105a^4x^{12}b^6y^6 - \frac{1}{2187}b^{14}y^{14} - \frac{7}{9}a^2x^6b^{10}y^{10} + 2187a^7x^{21} + \frac{35}{3}a^3x^9b^8y^8 + \frac{7}{243}ax^3b^{12}y^{12}\}}$.

362. $\sqrt[7]{\{\frac{140}{3}a^9x^6b^8y^{12} + \frac{105}{4}a^{12}x^8b^6y^9 + \frac{448}{9}a^6x^4b^{10}y^{15} + \frac{567}{64}a^{15}x^{10}b^4y^6 + \frac{7168}{243}a^3x^2b^{12}y^{18} + \frac{1701}{1024}a^{18}x^{12}b^2y^3 + \frac{16384}{2187}b^{14}y^{21} + \frac{2187}{16384}a^{21}x^{14}\}}$.

363. $\sqrt[7]{\{354375a^{24}b^{15}x^{28}y^{24}+590625a^{18}b^{20}x^{21}y^{32}+590625a^{12}b^{25}x^{14}y^{40}+328125a^{6}b^{30}x^{7}y^{48}+78125b^{35}y^{56}+2187a^{42}x^{49}+25515a^{36}b^{5}x^{42}y^{8}+127575a^{30}b^{10}x^{35}y^{16}+128a^{49}x^{42}+1344a^{48}x^{43}+2240a^{42}b^{5}x^{36}y^{8}+6048a^{47}x^{44}+20160a^{41}b^{5}x^{37}y^{8}+16800a^{35}b^{10}x^{30}y^{16}+15120a^{46}x^{45}+75600a^{40}b^{5}x^{38}y^{8}+126000a^{34}b^{10}x^{31}y^{16}+70000a^{28}b^{15}x^{24}y^{24}+22680a^{45}x^{46}+151200a^{39}b^{5}x^{39}y^{8}+378000a^{33}b^{10}x^{32}y^{16}+420000a^{27}b^{15}x^{25}y^{24}+175000a^{21}b^{20}x^{18}y^{32}+20412a^{44}x^{47}+170100a^{38}b^{5}x^{40}y^{8}+567000a^{32}b^{10}x^{33}y^{16}+945000a^{26}b^{15}x^{26}y^{24}+787500a^{20}b^{20}x^{19}y^{32}+262500a^{14}b^{25}x^{12}y^{40}+10206a^{43}x^{48}+102060a^{37}b^{5}x^{41}y^{8}+425250a^{31}b^{10}x^{34}y^{16}+945000a^{25}b^{15}x^{27}y^{24}+1182250a^{19}b^{20}x^{20}y^{32}+787500a^{13}b^{25}x^{13}y^{40}+218750a^{7}b^{30}x^{6}y^{48}\}$.

364. $\sqrt[7]{\{a^7x^{14}\}\{1+7ax\{1+4ax+6a^2x^2+3a^3x^3\}+35a^3x^3\{1+a^3x^3+3ax\{1+ax\}\}+35a^4x^4\{1+2ax\{2+3ax+2a^2x^2\}+a^4x^4\}+21a^5x^5\{1+5ax\{1+2ax+2a^2x^2+a^3x^3\}+a^5x^5\}+7a^6x^6\{1+6ax\{1+a^4x^4\}+5a^2x^2\{3+4ax+3a^2x^2\}+a^6x^6\}+a^7x^7\{1+a^7x^7+7ax\{1+a^5x^5\}+21a^2x^2\{1+a^5x^5\}+35a^3x^3\{1+ax\}\}\}\}}$.

365. $\sqrt[7]{\{2187a^{14}x^{14}\}\{1-a^7x^7\{2-3ax\}^7\}-7ax\{2-3ax\}\{1-a^5x^5\{2-3ax\}^5\}+21a^2x^2\{2-3ax\}^2\{1-a^5x^5\{2-3ax\}^5\}-35a^3x^3\{2-3ax\}^3\{1-ax\{2-3ax\}\}\}\}}$.

366. $\sqrt[7]{\left\{\frac{a^{21}x^{14}}{b^{14}y^{21}}+\frac{b^{21}y^{14}}{a^{14}x^{21}}+7\left\{\frac{a^{16}x^{9}}{b^{9}y^{16}}+\frac{b^{16}y^{9}}{a^{9}x^{16}}\right\}+21\left\{\frac{a^{11}x^{4}}{b^{4}y^{11}}+\frac{b^{11}y^{4}}{a^{4}x^{11}}\right\}+35\left\{\frac{a^{6}b}{xy^{6}}+\frac{ab^{6}}{x^{6}y}\right\}\right\}}$.

367. $\sqrt[7]{\left\{\frac{128a^{35}b^{21}}{2187x^{21}y^{35}}+\frac{2187a^{14}x^{42}}{128b^{42}y^{14}}+\frac{224a^{32}b^{12}}{243x^{12}y^{32}}+\frac{56a^{29}b^{3}}{9x^{3}y^{29}}+\frac{70a^{26}x^{6}}{3b^{6}y^{26}}+\frac{105a^{23}x^{15}}{2b^{15}y^{23}}+\frac{567a^{20}x^{24}}{8b^{24}y^{20}}+\frac{1701a^{17}x^{33}}{32b^{33}y^{17}}\right\}}$.

CAPITULO V.

CALCULO DE RADICALES RÉALES Ó IMAGINARIOS.

ARTICULO I.

De los radicales reales.

§ I.—SUMA.

368. $\{2ab+3c\sqrt{48}-2b\sqrt[3]{54}\}+\{3c+2b\sqrt[3]{16}+2c\sqrt{27}\}$.

369. $\{8+3\sqrt{45a^7}-8a\sqrt[3]{250b^5}\}+\{12-2\sqrt{245a^3}+3\sqrt[3]{1458b^{11}}\}+\{8abc+5\sqrt{20a^5}-9b\sqrt[3]{54b^8}\}$.

370. $\{\sqrt{28a^3}+5b\sqrt[3]{7a^4b^6}-8b\sqrt[4]{7a^5b}\}+\{\sqrt{343a^5}-2a\sqrt[3]{875ab^9}+5\sqrt[4]{112a^5b^5}\}+\{7\sqrt{175a^{13}}+3\sqrt[3]{56ab^{12}}+\sqrt[4]{7a^9b^9}\}$.

371. $\{3\sqrt{2a^4b^2}-a\sqrt[3]{375b^6}+b^2\sqrt[4]{96a^8}\}+\{a^2\sqrt{50b^2}+8\sqrt[3]{3a^3b^6}-a^2\sqrt[4]{12441 6b^8}\}+\{-b\sqrt{18a^4}+b^2\sqrt[3]{375a^3}+7\sqrt[4]{6a^8b^8}\}$.

372. $\{2\sqrt{80a^6b^4c^2} - 3\sqrt[3]{128a^6b^9c^3} + a\sqrt[4]{26244b^8c^{12}}\} +$
$\{3\sqrt{20a^6b^4c^2} - c\sqrt[3]{1458a^6b^9} + 4\sqrt[4]{324a^4b^8c^{12}}\} +$
$\{a^3\sqrt{245b^4c^2} + 2\sqrt[3]{2a^6b^9c^3} + b^2\sqrt[4]{5184a^4c^{12}}\}.$

373. $\{2\sqrt{2a^{11}b^9c^7} + 3\sqrt[3]{24a^{10}b^8c^3} - 5c\sqrt[4]{5a^4b^{11}c^8}\} +$
$\{3a\sqrt{32a^9b^9c^7} - 8ab\sqrt[3]{3a^7b^5c^3} - 9c^3\sqrt[4]{5a^4b^{11}}\} +$
$\{-2a^3b^3c^2\sqrt{2a^5b^3c^3} + 3\sqrt[3]{3a^{10}b^8c^3} +$
$b^2\sqrt[4]{405a^4b^3c^{12}}\}.$

§ II.—RESTA.

374. $\{c^4\sqrt{75a^7b^9c^6} - 3b^3\sqrt[3]{2a^8b^6c^{19}} + 7a\sqrt[4]{9a^8b^{13}c^6}\}$
$-\{3a\sqrt{3a^5b^9c^{14}} - c^3\sqrt[3]{1458a^8b^{15}c^{10}} +$
$2\sqrt[4]{9a^{12}b^{13}c^6}\}.$

375. $\{2a\sqrt{16b^5c^7} - 3c^2\sqrt[3]{320a^{14}c^9} - 5b^2\sqrt[5]{1701a^{20}b^8c^{13}}\}$
$-\{-11b\sqrt{a^2b^3c^7} - 5\sqrt[3]{5a^{14}c^{15}} + a\sqrt[5]{224a^{15}b^{18}c^{13}}\}.$

376. $\{3a^3\sqrt{5b^5c^2d} - 2d\sqrt[3]{320a^{17}b^{12}} - 3\sqrt[5]{a^{28}b^{10}c^{15}d^2}\}$
$-\{b^2c\sqrt{45a^6bd} - a^5b^4\sqrt[3]{2560a^2d^3}$
$-b^2\sqrt[5]{243a^{28}c^{15}d^2}\}.$

377. $\{3a\sqrt{bc} + 5b\sqrt[3]{a^2b} - 7c^3\sqrt[4]{b^3c^2}\} - \{3a^4\sqrt{bc}$
$-3b\sqrt[3]{a^2b} + 5a^3\sqrt[4]{b^3c^2}\}.$

378. $\{8a^3b^2c\sqrt{2}-3a^3\sqrt[3]{3}+8\sqrt[4]{4}\}-\{5ab^2c^3\sqrt{2}+2a^3b^2\sqrt[3]{3}-9a^4b^3c^2\sqrt[4]{4}\}$.

379. $\{7a^2c\sqrt[3]{b^2}-5a^3b\sqrt[4]{c^3}-8a\sqrt[5]{b^2c^3}\}-\{4ab^{\frac{2}{3}}+3a^3bc^{\frac{3}{4}}-8ab^{\frac{2}{5}}c^{\frac{3}{5}}\}$.

380. $\{\{9a^2\sqrt[3]{b^2c}+5a^3\sqrt[4]{bc^2}\}+\{a^3\sqrt[3]{b^2c}-2a^3\sqrt[4]{bc^2}\}\}-\{a^2b^{\frac{2}{3}}c^{\frac{1}{3}}-4a^2b^{\frac{1}{4}}c^{\frac{1}{2}}\}$.

381. $\{\{8a^3b^2\sqrt{b+c}+8\{b+c\}\sqrt[3]{\{b+c\}^2}+\{5a^2b^3\sqrt{b+c}-3\{b+c\}^2\sqrt[3]{\{b+c\}^2}\}\}-\{5a^2b^2\{b+c\}^{\frac{1}{2}}+2\{b^2-c^2\}\{b+c\}^{\frac{2}{3}}\}\}$.

§ III.—MULTIPLICACION.

382. $\sqrt[3]{a^2b}\times\sqrt[3]{ab^2}$.

383. $\sqrt[4]{\{a+b\}^3}\times\{c-d\}^2\times\sqrt[4]{\{a+b\}^2\times\{c-d\}^3}$.

384. $\sqrt{a+b}\times\sqrt[3]{\{a-b\}^2}$. **385.** $\sqrt[3]{\{a+b\}^2}\times\sqrt[6]{\{a-b\}^5}$.

386. $\sqrt[4]{a^2-b^2}\times\sqrt[6]{a^2+b^2}$.

387. $\{3a\sqrt{a+b}+5b\sqrt[3]{a^2-b^2}\}\{3a\sqrt{a+b}-5b\sqrt[3]{a^2-b^2}\}$.

388. $\{\{a+b\}\sqrt{a^2+b^2}+\{a-b\}\sqrt{a^2-b^2}\}\times\{\{a+b\}\sqrt{a^2+b^2}-\{a-b\}\sqrt{a^2-b^2}\}$.

389. $\left\{\{a^2+b^2\}\sqrt{a^2-b^2}+\{a^2-b^2\}\sqrt{a^2+b^2}\right\}\times\left\{\{a^2+b^2\}\sqrt{a^2-b^2}-\{a^2-b^2\}\sqrt{a^2+b^2}\right\}$.

390. $\left\{\sqrt[4]{\{a^3+b^3\}^3}+\sqrt[6]{\{a^3-b^3\}^3}\right\}\times\left\{\sqrt[4]{\{a^3-b^3\}^3}+\sqrt[6]{\{a^3+b^3\}^3}\right\}$.

391. $\{\sqrt{a^2+b^2}+\sqrt[3]{a^2-b^2}\}\{\sqrt{a^2-b^2}+\sqrt[3]{a^2+b^2}\}$.

392. $\sqrt[3]{x-a}\times\sqrt[3]{x^2+ax+a^2}\times\sqrt[5]{x^5+a^5}$.

393. $\sqrt[3]{x-a}\times\sqrt[6]{x^2+ax+a^2}\times\sqrt[4]{x^3+a^3}$.

394. $\sqrt{x-a}\times\sqrt[3]{x^2+ax+a^2}\times\sqrt[4]{x+a}\times\sqrt[6]{x^2-ax+a^2}$.

395. $\{\sqrt{a+b}+\sqrt[3]{a-b}+\sqrt[4]{a^2-b^2}\}\times\{\sqrt{a-b}-\sqrt[3]{a+b}-\sqrt[4]{a^2+b^2}\}$.

396. $\{2a\sqrt{a^2-b}+2b\sqrt[3]{a-b^2}+2ab\sqrt[3]{a^2-b^2}\}\times\{2a\sqrt{a^2-b}+2b\sqrt[3]{a-b^2}-2ab\sqrt[3]{a^2-b^2}\}$.

§ IV.—DIVISION.

397. $\sqrt[4]{a^2-b^2}:\sqrt[6]{a^3-b^3}$.

398. $\sqrt[10]{a^5-b^5}:\sqrt[15]{a^4-b^4}$.

399. $\sqrt[4]{\frac{a+b}{a-b}-\frac{a-b}{a+b}}:\sqrt[6]{\frac{2a+b}{a^2-b^2}-\frac{a^2-b^2}{a+2b}}$.

400. $\sqrt[4]{\frac{a+b}{a-b}-\frac{a-b}{a+b}}:\sqrt[10]{\frac{a^2+b^2}{a^2-b^2}-\frac{a^2-b^2}{a^2+b^2}}$.

401. $\sqrt{\left\{\frac{a}{b}-\frac{b}{a}\right\}\left\{\frac{a+b}{2a}+\frac{a-b}{2b}\right\}} : \sqrt[3]{\left\{\frac{a}{b^2}-\frac{b}{a^2}\right\}\left\{\frac{1}{a}+\frac{1}{b}\right\}}$.

402. $\sqrt[6]{\frac{\left\{8+\frac{a}{3}\right\}\left\{a-\frac{8}{3}\right\}}{\frac{a}{8}-\frac{8}{a}}} : \sqrt[9]{\frac{\left\{8-\frac{a}{3}\right\}\left\{a+\frac{8}{3}\right\}}{\frac{a}{8}+\frac{8}{a}}}$.

403. $\left\{64a^2\{a^3-b^3\}-81b^2\sqrt[3]{\{a^2-b^2\}^2}\right\} : \left\{8a\sqrt{a^3-b^3}-9b\sqrt[3]{a^2-b^2}\right\}$.

404. $\left\{4\left\{16a^2\{a^2+b^2\}-b^2+3bc\sqrt{a^3+b^3}\right\}-9c^2\{a^3+b^3\}\right\} : \left\{8a\sqrt{a^2+b^2}+2b-3c\sqrt{a^3+b^3}\right\}$.

405. $\left\{49a^2b^2+42abc\sqrt{a+b}+9c^2\{a+b\}-25a^4+20a^2b^2\sqrt[3]{a-b}-4b^4\sqrt[3]{\{a-b\}^2}\right\} : \left\{7ab+3c\sqrt{a+b}+5a^2-2b^2\sqrt[3]{a-b}\right\}$.

406. $\left\{5\{a^2-b^2\}+2\{a^2+b^2\}\sqrt{6}\right\} : \left\{\{a+b\}\sqrt{2}+\{a-b\}\sqrt{3}\right\}$.

407. $\left\{6\{a^2-c^2\}\sqrt[6]{\{a^2-b^2\}^2\{a-b\}}+4ac\sqrt{\{a+b\}^2}+10a^2b\sqrt[12]{\{a+b\}^7\{a-b\}^3}-9ac\{a-b\}-15abc\sqrt[4]{\{a-b\}^3\{a+b\}}\right\} : \left\{3a\sqrt{a-b}+2c\sqrt[3]{a+b}+5ab\sqrt[4]{a^2-b^2}\right\}$.

408. $\left\{(a^2-b^2)(3-\sqrt[3]{4})-4ab\sqrt[6]{108}\right\}:\left\{(a+b)\sqrt{3}+(a-b)\sqrt[3]{2}\right\}$.

§. V.—ELEVACION Á POTENCIAS.

409. $\left\{3a^2\sqrt{5a^2-3b^2}+3ab\sqrt[3]{2a^3-3b^2}\right\}^2$.

410. $\left\{3a^2\sqrt{5(a+b)}+2b^2\sqrt{5(a-b)}\right\}^2$.

411. $\left\{5a^3\sqrt{a^2-b^2}-3b^3\sqrt[3]{a^2+b^2}\right\}^2$.

412. $\left\{7(a+b)\sqrt[3]{(a-b)^2}+5(a+b)\sqrt{a-b}\right\}^2$.

413. $\left\{(a+b)\sqrt{a-b}+(a-b)\sqrt{a+b}\right\}^2$.

414. $\left\{(a+b)\sqrt{a-b}-(a-b)\sqrt{a+b}\right\}^2$.

415. $\left\{(a^3-b^3)\sqrt[3]{(a-b)^2}+(a^3-b^3)\sqrt{a-b}\right\}^2$.

416. $\left\{2a\sqrt{2a+b}+2b\sqrt{2a-b}+2ab\sqrt{a-2b}\right\}^2$.

417. $\left\{2(a+b)\sqrt[4]{(a-b)^3}+5(a-b)\sqrt[3]{(a+b)^2}+10(a^2+b^2)\sqrt{a^2-b^2}\right\}^2$.

418. $\left\{\sqrt[3]{3a+2b}-\sqrt[3]{3a-2b}\right\}^3$.

419. $\left\{(3a-5)\sqrt[3]{5-3a}-(5-3a)\sqrt[3]{3a-5}\right\}^3.$

420. $\left\{(2a+b)\sqrt[3]{3a+2b}+(3a-2b)\sqrt{2a-b}\right\}^3.$

421. $\left\{3a^2\sqrt[3]{a+b}+2b^2\sqrt{a-b}+6a^2b^2\sqrt[4]{a^2-b^2}\right\}^3.$

422. $\left\{(a+b)\sqrt{a^2+b^2}+(a-b)\sqrt[3]{a^2-b^2}\right\}^3.$

423. $\left\{(3a+b)\sqrt[3]{3a-b}+(3a-b)\sqrt{3a+b}+\sqrt[4]{9a^2-b^2}\right\}^3.$

424. $\left\{2a\sqrt{a+b}+2b\sqrt{a-b}+2ab\sqrt{a^2-b^2}\right\}^3.$

425. $\left\{3a\sqrt[3]{b}+3b\sqrt[3]{a}\right\}^4.$

426. $\left\{3a\sqrt[4]{a+b}+3b\sqrt[4]{a-b}\right\}^4.$

427. $\left\{\sqrt{x-a}+\sqrt[3]{x+a}+\sqrt[4]{x^2-a^2}\right\}^4.$

428. $\left\{5a^2\sqrt[3]{a^2+b^2}-3b^2\sqrt[4]{a^2-b^2}+7a^2b^2\sqrt[5]{a^3-b^3}\right\}^4.$

429. $\left\{(a+b)\sqrt[4]{a^3-b^3}-(a^2-b^2)\sqrt[5]{a^3+b^3}+\sqrt[6]{a^3-b^3}\right\}^4.$

430. $\left\{5a\sqrt[3]{a^2}+(2a+b)\sqrt[5]{a^2-b^2}+(a+2b)\sqrt[4]{a^2+b^2}\right.$
$\left.+5a^3\sqrt{a}\right\}^4.$

ARTICULO II.

Cálculo de las expresiones imaginarias.

§ 1.—SUMA.

431. $\{4+3\sqrt{-242}+13\sqrt{-432}\}+\{8-5\sqrt{-98}+7\sqrt{-108}\}+\{8\sqrt{-2}-7\sqrt{-3}+\sqrt{-1250}\}$.

432. $\{a+43\sqrt{-a^2b^4c^6}+5\sqrt{-2a^8b^6}\}+\{9ab-3a\sqrt{-9a^2b^4c^2}+5a\sqrt{-7a^2b^2}\}+\{7ab-7a\sqrt{-7a^2b^2}+3\sqrt{-2a^8b^6}\}$.

433. $\{\sqrt{6}+5a\sqrt{-a^2b^2}+3\sqrt{-a^4b^4}\}+\{4\sqrt{6}+11a\sqrt{-a^2b^2}-9\sqrt{-a^4b^4}\}+\{9a\sqrt{6}+3ab\sqrt{-a^2b^2}+17b^3\sqrt{-a^4b^4}\}$.

434. $\{\{a+1\}\sqrt{-a^6b^4}+\{a^2-b^2\}\sqrt{-b^6}\}+\{\{a-1\}\sqrt{-a^6b^4}-\{a^2+b^2\}\sqrt{-b^6}\}+\{\{2a+2\}\sqrt{-a^6b^4}+\{3a^2-5b^2\}\sqrt{-b^6}\}$.

435. $\{5ab\sqrt{a}\sqrt{-a^2b^4}+3a\sqrt[3]{ab}\sqrt{-a^2b^2}\}+\{3b\sqrt{ab}\sqrt{-a^2b^4}-7ab\sqrt[3]{ab^2}\sqrt{-a^2b^2}\}+\{3ab+7\sqrt[3]{a^2b}\sqrt{-a^2b^2}-3ab\sqrt{-b^4}\}$.

436. $\left\{3a\sqrt[4]{a}\sqrt{-a^2b^2}+3b\sqrt[5]{b^2}\sqrt{-a^2}\right\}+\left\{11a\sqrt[4]{a^3b^2}\times\sqrt{-a^2b^2}-7b\sqrt[5]{a^8b^2}\sqrt{-a^2b^2}\right\}+\left\{7a\sqrt[4]{a^3}\sqrt{-b^2}+11\sqrt[5]{b^4}\sqrt{-a^2}\right\}$.

437. $\left\{3a+5\sqrt{-845}+11\sqrt[3]{3}\sqrt{-912247}\right\}+\left\{9b-12\sqrt{-720}-20\sqrt[3]{3}\sqrt{-2023}\right\}+\left\{\sqrt[3]{3}\sqrt{-354375}-9\sqrt{-180}\right\}$.

438. $\left\{\sqrt[3]{2}\sqrt{-50}-\sqrt{3}\sqrt{-448}-5\sqrt{-2}\right\}+\left\{3a\sqrt[3]{2}\sqrt{-242}-3\sqrt{3}\sqrt{-3087}-9\sqrt{-6}\right\}+\left\{3b\sqrt[3]{2}\sqrt{-338}+7a^2b^2\sqrt{3}\sqrt{-2527}\right\}$.

439. $\left\{5+3\sqrt[6]{-72}+5\sqrt[10]{-6075}\right\}+\left\{8\sqrt{-2}-7\sqrt{-3}+11\sqrt{-12}\right\}+\left\{7a\sqrt[6]{-108}-11\sqrt{-6}-8\sqrt{-6a^4}\right\}$.

440. $\left\{\{5a+3b\}\sqrt[5]{2}\sqrt{-5}+\{3a^2+2b^3\}\sqrt[3]{5}\sqrt{-7}-3a^2\sqrt{-2}\right\}+\left\{\{5a-3b\}\sqrt[5]{2}\sqrt{-5}+\{3a^2-2b^3\}\sqrt[3]{5}\sqrt{-7}+3b^2\sqrt{-2}\right\}+\left\{\{a^2+b^2\}\sqrt[5]{2a^7}\sqrt{-5}-3a^2b^2\sqrt[3]{5a^6}\sqrt{-7}-\{a+b\}\sqrt{-2a^4}\right\}$.

§ II —RESTA.

441. $\{3+5\sqrt{-338}+9\sqrt{-847}\}-\{5-8\sqrt{-578}-6\sqrt{-567}\}$.

442. $\{17+5\sqrt{-625}+8\sqrt{-128}\}-\{9-8\sqrt{-25}+7\sqrt{-98}\}$.

443. $\left\{\sqrt[5]{3}\sqrt{-2}+\sqrt[5]{2}\sqrt{-3}\right\}-\left\{\sqrt[3]{81}\sqrt{-50}-\sqrt[3]{50}\sqrt{-81}\right\}$.

444. $\left\{3\tfrac{2}{3}\sqrt{-3}-0,5\sqrt{-2}\right\}-\left\{\sqrt{-50}-1,7\sqrt{-7}\right\}$.

445. $\left\{\{3a+2b\}\sqrt{-8}+\{a-b\}\sqrt{-27}\right\}-\left\{\{3a-2b\}\sqrt{-12}-\{a+b\}\sqrt{-8}\right\}$.

446. $\left\{\left\{a+\tfrac{2}{3}b\right\}\sqrt{-a^2b^4}+\left\{\tfrac{2}{3}a-b\right\}\sqrt{-a^4}\right\}-\left\{\left\{0,5a+\tfrac{b}{3}\right\}\sqrt{-a^2b^2}-\left\{\tfrac{a}{3}-0,5b\right\}\sqrt{-b^6}\right\}$.

447. $\left\{\{a^2+0,5a+b^2\}\sqrt{-a^6}+\{a^2-b^2\}\sqrt{-b^4}\right\}-\left\{\{a^2-0,3a-b^2\}\sqrt{-a^6}-\{a^2+b^2\}\sqrt{-b^4}\right\}$.

448. $\left\{\left\{3a+5\right\}\sqrt{-2}+\{2a+b\}\sqrt{-3}\right\}-\left\{\{5-3a\}\sqrt{-2}-\{b-2a\}\sqrt{-3}\right\}$.

§. III.—MULTIPLICACION.

449. $\{17+\sqrt{-48}\}\{15+\sqrt{-75}\}$.

450. $\{4+\sqrt{-108}\}\{5-\sqrt{-72}\}$.

451. $\left\{4\tfrac{2}{3}+5\sqrt{-125}\right\}\left\{8\tfrac{3}{4}-7\sqrt{-75}\right\}$.

452. $\left\{7-\frac{3}{4}+2\sqrt{-288}\right\}\ \left\{5-\frac{2}{3}-4\sqrt{-432}\right\}$.

453. $\left\{8-\frac{3}{4}+5\sqrt{-242}\right\}\ \left\{8-\frac{3}{4}-5\sqrt{-242}\right\}$.

454. $\left\{7-\frac{2}{3}+\frac{3}{2}\sqrt{-75}\right\}\ \left\{7-\frac{2}{3}-\frac{3}{2}\sqrt{-75}\right\}$.

455. $\left\{4+\frac{3}{5}-2\sqrt{-48}\right\}\ \left\{4-\frac{3}{5}+2\sqrt{-48}\right\}$.

456. $\left\{\sqrt{2}+3\sqrt[6]{5}\sqrt{-2}\right\}\ \left\{\sqrt{2}-3\sqrt[6]{5}\sqrt{-2}\right\}$.

457. $\left\{2a+b+2c\sqrt{-(a^2+b^2)}\right\}\ \left\{2a-b-2c\sqrt{-a^2}\right\}$.

458. $\left\{3a+2b+c\sqrt{-(a^2+b^2)}\right\}\ \left\{3a-2b-c\sqrt{-(a^2+b^2)}\right\}$.

459. $\left\{(a+b)^2+(a-b)^2\sqrt{-a^2}\right\}\ \left\{(a-b)^2-(a+b)^2\sqrt{-a^2}\right\}$.

460. $\left\{(a+b)^2+(a-b)^2\sqrt{-2a^2}\right\}\ \left\{(a+b)^2-(a-b)^2\sqrt{-2a^2}\right\}$.

461. $\left\{\sqrt{a^2-b^2}+\sqrt{-(a^2+b^2)}\right\}\ \left\{\sqrt{a^2-b^2}-\sqrt{-(a^2+b^2)}\right\}$.

462. $\left\{\sqrt{a^2-b^2}+\sqrt{-(a^2+b^2)}\right\}\ \left\{\sqrt{a^2+b^2}-\sqrt{-(b^2-a^2)}\right\}$.

463. $\{\sqrt{a^2+b^2}+\sqrt{-\{a-b\}^2}\}\{\sqrt{a^2-b^2}-\sqrt{-\{a+b\}^2}\}$.

464. $\{\sqrt{a^2+b^2}+\sqrt{-\{a^2-b^2\}^2}\}\{\sqrt{a^2+b^2}-\sqrt{-\{a^2-b^2\}^2}\}$.

§. IV.—DIVISION.

465. $\{6-6\sqrt{6}+\{4\sqrt{3}+9\sqrt{2}\}\sqrt{-1}\}:\{3+2\sqrt{-3}\}$.

466. $\{\sqrt[6]{72}+3\sqrt[6]{243}-3\{2+3\sqrt{6}\}\sqrt{-1}\}:\{\sqrt[3]{3}-3\sqrt{-2}\}$.

467. $\{6a^2-b^2\sqrt{6}+ab\{2\sqrt{2}+3\sqrt{3}\}\sqrt{-1}\}:\{3a+b\sqrt{-2}\}$.

468. $\{\{9a^2-b^2\}\{1-a^4b^2\}+2a^2b\{9a^2+b^2\}\sqrt{-1}\}:\{\{3a+b\}+\{3a-b\}\sqrt{-a^4b^2}\}$.

469. $a^2c\{\{6c+b^3\}+b\{2c-3b\}\sqrt{-1}\}:\{3a^2+\sqrt{-a^4b^2}\}$.

470. $\{\{15a^2-16ab-15b^2\}\{c^2+1\}+\{16b^2-16a^2-60ab\}c\sqrt{-1}\}:\{5a+3b+\{3a-5b\}\sqrt{-c^2}\}$.

471. $\{9a^4+6a^3b+a^2\{b^2+1\}+6ab+9b^2\}:\{a+3b+\{3a+b\}\sqrt{-a^2}\}$.

472. $\{a^4\}\{b^4 + 1\}\{9a^2 + 4b^2\} + 12ab\{1 - b^4\}\}$
$:\{a^2\{3a+2b\}+b^2\{3a-2b\}\sqrt{-a^4}\}$.

473. $\{\{2\sqrt{2}+0,5\sqrt{0,5}\}\sqrt{-1}\}:\{2+\sqrt{-0,5}\}$.

474. $\{1,5 + 1,5\sqrt{6} + \{0,25\sqrt{2} - 9\sqrt{3}\}\sqrt{-1}\}$
$:\{3 + 0,5\sqrt{-2}\}$.

475. $1,875:\{\frac{3}{4}\sqrt{2}+0,5\sqrt{-3}\}$.

476. $\{\frac{9}{4}+2\sqrt{6}+\{\frac{1}{2}\sqrt{3}-9\sqrt{2}\}\sqrt{-1}\}:\{3+\frac{2}{3}\sqrt{-3}\}$.

477. $\{\{\frac{15}{52}+\frac{10}{9}\sqrt{6}+\{\frac{25}{24}\sqrt{2}-\frac{1}{2}\sqrt{3}\}\sqrt{-1}\}:\{\frac{3}{4}+\frac{5}{3}\sqrt{-2}\}$.

§. V.— POTENCIAS.

478. $\{3+2\sqrt{-3}\}^2$. **479.** $\{\sqrt{2}+\sqrt{-2}\}^2$.

480. $\{\sqrt{-2}+\sqrt{-3}\}^2$.

481. $\{\sqrt{-2}+\sqrt{-3}+\sqrt{-5}\}^2$.

482. $\{3a+2b\sqrt{-1}\}^2$. **483.** $\{2a^2-3b^3+\sqrt{-1}\}^2$.

484. $\{3a+2b+\{3a-2b\}\sqrt{-1}\}^2$.

485. $\{5+\sqrt{-7}\}^3$ **486.** $\{\sqrt{3}+\sqrt{-5}\}^3$.

487. $\{\sqrt{-7}+\sqrt{-11}\}^5$.

488. $\{\sqrt{-3}+\sqrt{-5}+\sqrt{-7}\}^5$.

489. $\{2a^3+3b^2\sqrt{-1}\}^5$. **490.** $\{5a^4+4b^5+\sqrt{-1}\}^5$.

491. $\{\sqrt{a-b}-(a+b)\sqrt{-1}\}^5$.

492. $\{\sqrt[5]{(a-b)^2}+(a+b)\sqrt{-1}\}^5$. **493.** $\{9+\sqrt{-7}\}^4$.

494. $\{\sqrt{2}+\sqrt{-2}\}^4$. **495.** $\{\sqrt{2}+\sqrt{-3}\}^4$.

496. $\{\sqrt{-2}+\sqrt{-3}\}^4$.

497. $\{3\sqrt{-2}+2\sqrt{-3}+6\sqrt{-6}\}^4$.

498. $\{3a+7b\sqrt{-1}\}^4$.

499. $\{(3a^2-5b)^2+(2a^3-3b^2)\sqrt{-1}\}^4$.

500. $\{\sqrt[5]{3a^2-b}-\sqrt{-(a^2+b^2)}\}^4$.

ARTICULO III.

Módulos.

§ I. — HALLAR EL MÓDULO DE CADA UNA DE LAS ESPRESIONES IMAGINARIAS SIGUIENTES.

501. $12-5\sqrt{-1}$. **502.** $7-24\sqrt{-1}$.

503. $\sqrt{1080}-17\sqrt{-1}$. **504.** $\sqrt{113}-\sqrt{-176}$.

505. $\sqrt{\frac{3020}{617089}}-\sqrt[26]{-1}$. **506.** $a-b+2\sqrt{-ab}$.

507. $\sqrt{a^2+b^2}+\sqrt{-2ab}$.

508. $a^5b-ab^5+2a^2b^2\sqrt{-1}$.

509. $a^2b^4-x^2y^4+2ab^2xy^2\sqrt{-1}$.

510. $3a-2b+c+\sqrt{-24ab}$.

§ II. —MÓDULO DE UN PRODUCTO.

511. $\{\sqrt{240}-\sqrt{-289}\}\{\sqrt{412}-\sqrt{-117}\}$.

512. $\{3+4\sqrt{-1}\}\{\sqrt{20}+\sqrt{-16}\}$.

513. $\{\frac{1}{12}\sqrt{19}+\frac{5}{4}\sqrt{-1}\}\{25+\sqrt{-671}\}$.

514. $\{\frac{115}{225}+\frac{1}{225}\sqrt{-227}\}\{\frac{525}{751}+\sqrt{-\frac{162C6288}{162996289}}\}$.

515. $\{\sqrt{1000}+\sqrt{-369}\}\{\sqrt{20000}+\sqrt{-449}\}$.

516. $\{\sqrt{2ab}+\sqrt{-(a^2+b^2)}\}\{\sqrt{4}+\sqrt{-12}\}$.

517. $\{2ab^2+3ab+\sqrt{-(9a^4-4a^2b^4+18a^2b^5+25b^6-9a^2b^2)}\}\{a^5+b^5+\sqrt{-(6a^5b^5+15b^6)}\}$.

518. $\{7a^2-3b^2+ab\sqrt{-84}\}\{13a^5x-12ax^5+a^5x^5\sqrt{-624}\}$.

519. $\{\sqrt{12x^5y+30x^2y^2+20xy^5}+\sqrt{-9x^4-4x^2y^2-25y^4}\}\{\sqrt{6x^2y^2+4x^5y+4xy^5}+\sqrt{-x^4-y^4}\}$.

520. $\{\sqrt{121x^8+64}+\sqrt{81x^6+198x^7+176x^4+144x^5}\sqrt{-1}\}\{\sqrt{42x^7+70x^4+30x^5}+\sqrt{49x^8+9x^6+25}\times\sqrt{-1}\}$.

§ III.—MÓDULO DE UN COCIENTE.

521. $\{6-\sqrt{6}+2\sqrt{-3}+3\sqrt{-2}\}:\{3+\sqrt{-3}\}$.

522. $\left\{-3+\sqrt[6]{32}+\{\sqrt{6}+\sqrt[6]{108}\}\sqrt{-1}\right\}:\left\{\sqrt[5]{2}+\sqrt{-3}\right\}$.

523. $\{20-\sqrt{6}-5\sqrt{-2}-4\sqrt{-3}\}:\{4-\sqrt{-2}\}$.

524. $\{24\sqrt{-1}-15\}:\{8+5\sqrt{-1}\}$.

525. $\{6a^2-\sqrt{ab}+2a\sqrt{-a}+3a\sqrt{-b}\}:\{2a+\sqrt{-b}\}$.

526. $\left\{\{a^2-b^2\}^2+b^2-a^2+2a\{a^2+3b^2\}\sqrt{-1}\right\}:\left\{\{a+b\}^2+\sqrt{-\{a-b\}^2}\right\}$.

527. $\left\{\{a^2-b^2\}\{a+b\}+\{a-b\}^2\sqrt{-1}\right\}:\left\{\{a+b\}^2+\{a-b\}\sqrt{-1}\right\}$.

528. $\left\{a^2+2ab+b^2+\{a^2-b^2\}\sqrt{-1}\right\}:\left\{a+b+\{a-b\}\sqrt{-1}\right\}$.

ARTICULO IV.

Trasformacion de expresiones de la forma $\sqrt{A \pm \sqrt{B}}$.

529. $\sqrt{\{12+8\sqrt{2}\}}$. **530.** $\sqrt{\{23+6\sqrt{14}\}}$.

531. $\sqrt{\{237+12\sqrt{285}\}}$. **532.** $\sqrt{\{500+80\sqrt{39}\}}$.

533. $\sqrt{\{934+14\sqrt{885}\}}$. **534.** $\sqrt{\{678+9\sqrt{2035}\}}$.

535. $\sqrt{\{132+\sqrt{16799}\}}$. **536.** $\sqrt{\{857+\sqrt{38893}\}}$.

537. $\sqrt{\{798+\sqrt{233579}\}}$. **538.** $\sqrt{\{1234+\sqrt{548587}\}}$.

539. $\sqrt{\{3a^2b+3ab^2+\sqrt{\{9a^4b^2+18a^3b^3+9a^2b^4-a^4 -2a^2b^2-b^4\}}\}}$.

540. $\sqrt{\{5ab^2c^3 - 3a^3bc^2 + \sqrt{\{25a^2b^4c^6 - 30a^4b^3c^5 +9a^6b^2c^4-a^4b^2+2a^2b^3c-b^4c^2\}}\}}$.

541. $\sqrt{\{b\{5a^2+4ab+3c\}+\sqrt{3b^2c\{3c+10a^2+8ab\}}\}}$.

542. $\sqrt{\{b\}a\{3a+2b\}+5bc\}+\sqrt{\{a^2b^2\{9a^2+4b^2+ 12ab+30bc-2\}+b^2c^2\{25b^2-2\}-2a^2c^2+a\{20b^4c - -a^3\}-b^4-c^4\}}\}$.

543. $\sqrt{\{abc\{2b\{a^2-2bc\}+3ac^2\}+2ab^2c\sqrt{2c\{2b\{bc-a^2\}-3ac^2\}}\}}$.

544. $\sqrt{\{3a^2b-b\sqrt{b\{2a\{6a^2+ab-2b^2\}-b^3\}}\}}$.

545. $\sqrt{\{abc\{5a^2b+\sqrt{2abc\{10ab^2+15a^2c-6bc^2\}+c^2\}-4b^4-9a^2c^2\}\}}$.

546. $\sqrt{\{ab\{0,5a+0,3b\}+b\sqrt{\{a^2\{2,3a+4,4b-5,29\}+b\{1,92ab-10,24b-14,72a\}\}}\}}$.

547. $\sqrt{\{\frac{2}{5}a^3-\frac{5}{2}b^3-\sqrt{5ab\{3b^3-5ab-\frac{4}{5}a^3\}}\}}$.

548. $ab\sqrt{\{2\{0,6b+\frac{1}{5}a\}+\sqrt{\{41,6ab-14,56b^2-24\frac{5}{9}a^2\}}\}}$.

ARTICULO V.

Quitar la forma irracional, ó la imaginaria, á los denominadores de las fracciones siguientes.

549. $\frac{5+\sqrt{2}}{2+\sqrt{3}}$. **550.** $\frac{3+\sqrt{6}}{\{3+\sqrt{6}\}-\{6+\sqrt{5}\}}$.

551. $\frac{5a+2}{5a-2+\sqrt{-5}}$. **552.** $\frac{\sqrt{2}+\sqrt{3}}{\sqrt{-2}+\sqrt{-3}}$.

553. $\dfrac{3a+\sqrt{-3}}{3a-\sqrt{-3}}$.

554. $\dfrac{a^2}{a+\sqrt{a^2-b}}$.

555. $\dfrac{a+\sqrt{a^2-b}}{a-\sqrt{a^2-b}}$.

556. $\dfrac{\sqrt{a+b}}{\sqrt{a+b}+\sqrt{a-b}}$.

557. $\dfrac{\sqrt{a+b}}{\sqrt{a+b}-\sqrt{a-b}}$.

558. $\dfrac{3a}{2\sqrt{a}+3\sqrt{b}-4\sqrt{c}}$.

559. $\dfrac{a+b}{\sqrt{a}+\sqrt{2(a-b)}-3\sqrt{a^2-b}}$.

560. $\dfrac{3a+2b}{\sqrt{a^2+b}+\sqrt{a^2-b}-\sqrt{2ab}}$

561. $\dfrac{\sqrt{2}+\sqrt{a^2+b^2}}{\sqrt{2}+\sqrt{-a^2-b^2}}$.

CAPITULO VI.

OPERACIONES CON LAS CANTIDADES AFECTADAS DE ESPONENTES NEGATIVOS Ó FRACCIONARIOS.

ARTICULO I.

Operaciones con las cantidades que tienen esponentes negativos.

§. I.—SUMA.

562. $\{ab^4+b^5+a^{-1}b^6\}+\{ab^3+b^4+a^{-1}b^5+a^{-2}b^6\}+\{ab^2+b^3+a^{-1}b^4+a^{-2}b^5\}$.

563. $\{3a^{-2}b^3c^4+3^{-2}a^2b^{-3}c^4+3^{-1}a^2b^3c^{-4}\}+\{3^{-1}a^{-2}b^3c^4+3a^2b^{-3}c^4+3^{-2}a^2b^3c^{-4}\}+\{3^{-2}a^{-2}b^3c^4+3^{-1}a^2b^{-3}c^4+3a^2b^3c^{-4}\}$.

564. $\{2ab^2c^{-3}+3ab^{-2}c^3+5a^{-1}b^2c^3\}+\{2^{-1}ab^2c^{-3}+3^{-1}ab^{-2}c^3+5^{-1}a^{-1}b^2c^3\}+\{2^{-2}ab^2c^{-3}+3^{-2}ab^{-2}c^3+5^{-2}a^{-1}b^2c^3\}$.

565. $\{2a^{-7}b^4c^3+3a^{-5}b^3c^2+5a^{-3}b^2c\}+\{2^{-1}a^7b^{-4}c^3+3^{-2}a^5b^3c^{-2}+5^{-3}a^{-3}b^{-2}c\}$.

566. $\{3ab^3c^5+5a^3b^5c^7\}+\{3^{-2}a^{-1}b^{-3}c^{-5}+5^{-2}a^{-3}b^{-5}c^{-7}\}$.

567. $\left\{\frac{ab^{-2}}{c^3d^{-4}}+\frac{a^2b^{-1}}{c^4d^{-3}}\right\}+\left\{\frac{a^{-3}b^2}{c^{-1}d^4}+\frac{a^{-4}b^3}{c^{-1}d^{-4}}\right\}$.

568. $\left\{\frac{a^{-2}b^{-3}}{c^{-4}d^{-5}}+\frac{c^{-2}d^{-3}}{a^{-4}b^{-5}}\right\}+\left\{\frac{a^{-1}c^{-2}}{b^{-3}d^{-4}}+\frac{a^{-4}d^{-3}}{b^{-1}c^{-2}}\right\}$.

569. $\left\{\frac{3^{-1}a^2b^3}{5c^5}+\frac{5^{-2}a^3c^4}{3b^2}\right\}+\left\{\frac{2^{-1}b^{2\,3}}{3a^2}-\frac{2^{-1}a^{2\,4}}{5b^3}\right\}$.

§ II. — RESTA.

570. $\{3a^{-2}b+2^{-2}ab^{-3}\}-\{3^{-2}a^{-1}b-2^{-3}a^{-2}b^3\}$.

571. $\{a^{-2}b^3+3a^2\}-\{3^{-2}a^3+2^3b^{-2}\}$.

572. $\{0,03a^{-3}-0,02a^{-2}\}-\{2,5a^{-4}-0,03a^{-1}\}$.

573. $\{2^{-3}a^2+3^{-2}a^3\}-\{0,5a^{-3}+0,005a^{-2}\}$.

574. $\{3^{-2}a^2b^{-3}-0,3a^{-2}b^3\}-\{0,03a^2b^{-3}-3a^{-3}b^2\}$.

575. $\left\{\frac{5a^{-2}b^3}{2x^{-7}y^4}+\frac{2^{-5}a^3}{5b^{-2}y^5}\right\}-\left\{\frac{a^{-7}y^2}{2b^3x^{-2}}-\frac{2a^4c^{-2}}{3b^2y^{-3}}\right\}$.

576. $\{0,5a^3b^{-2}+0,03a^5b^4\}-\{2^{-3}a^2b^{-7}+0,7a^{-8}b^5\}$.

577. $\left\{3a^{-7}x^8-\frac{3^{-2}x^7a^{-3}}{5b^{-5}y^3}\right\}-\left\{3^{-2}a^7x^{-8}-\frac{9c^{-7}a^3}{5^{-2}b^5y^{-3}}\right\}$.

§ III. — MULTIPLICACION.

578. $\{3a^{-8}b^5c^5+5a^3b^{-7}c^4+9a^8bc^{-4}\}3a^5b^4c^5$.

579. $\{2^{-1}a^3b^{-2}c^{-1}-3^{-2}a^{-3}b^{-2}c$
$-5^{-1}a^{-3}b^2c^{-1}\}180a^3b^2c$.

580. $\{5a^{-3}b^{-2}c^{-1}+7a^{-2}b^{-1}c^{-3}-8a^{-1}b^{-3}c^{-2}\}a^{3}b^{3}c^{3}$.

581. $\{2^{-3}a^{2}bc^{-3}-3^{-2}a^{2}b^{-1}c^{3}-3^{-3}a^{-2}bc^{-3}\}18a^{3}b^{2}c$.

582. $\{27a^{2}b^{3}c-15a^{3}bc^{2}-25ab^{2}c^{3}\}15^{-3}a^{-1}b^{-2}c^{-3}$.

583. $\{3^{-2}a^{m}b^{-2n}c^{-3p}-2^{-3}a^{-m}b^{2n}c^{-3p}-2^{-2}a^{3m}b^{-n}c^{p}\}\times 2592a^{-m}b^{-n}c^{-p}$.

584. $\{x^{3}+2a^{-1}x^{2}+3a^{-2}x+a^{-3}\}\{x^{-2}+a^{-3}\}$.

585. $\{a^{2}x^{-2}-a^{3}x^{-3}+a^{4}x^{-4}\}\{ax^{-1}-a^{2}x^{-2}\}$.

586. $\{2a^{7}x^{-2}-3a^{8}x^{-3}+6a^{9}x^{-4}\}\{3a^{4}x^{-1}-2a^{5}x^{-2}+6a^{6}x^{-3}\}$.

587. $\{3a^{8}x^{-7}-2^{-2}a^{7}x^{-6}+3^{-1}a^{6}x^{-5}\}\{2^{-2}a^{4}x^{-2}-3^{-1}a^{5}x^{-1}+6a^{2}\}$.

588. $\{3^{-2}a^{5}+2^{-3}a^{6}x^{-1}-5^{-2}a^{7}x^{-2}\}\{2^{-3}a^{2}-3^{-2}a^{3}x^{-1}-2^{-3}a^{4}x^{-2}\}$.

589. $\{a^{2}-a^{3}x+a^{4}x^{2}\}\{a^{-2}-a^{-1}x+a^{-2}x^{2}\}$.

§ IV.—DIVISION.

590. $\{a^{-2}x^{-7}-a^{-3}x^{-6}+a^{-4}x^{-5}\}:a^{-8}x^{-7}$.

591. $\{a^{3}x^{8}-a^{4}x^{7}+a^{5}x^{6}\}:a^{8}x^{6}$.

592. $\{14a^{-12}x^{-7}-21a^{-11}x^{-6}+35a^{-10}x^{-10}\}:7a^{-3}x^{-7}$.

593. $\{10ax^{-1}-45\times 2^{-1}x^{-2}+18a^{2}x^{-3}-45a^{3}x^{-4}\}:90a^{4}x^{4}$.

594. $\{12a^{-7}x^2 - 18a^{-8}x^5 + 4a^{-6}x - 9a^{-9}x^4\} : 36a^{-5}x^5.$

595. $\{6a^{-5}x^{-4} + a^{-4}x^{-5} + 15a^{-5}x^{-5} - 15a^{-5}x^{-2} - 25a^{-6}x^{-4}\} : \{3a^{-2}x^{-2} - 5a^{-5}x^{-1}\}.$

596. $\{2^{-5}a^{-12}x^{-5} - 6^{-2} \times 2^{-1}a^{-8}x^{-9} - 6^{-2}a^{-9}x^{-8} + 3^{-4}a^{-5}x^{-12}\} : \{2^{-5}a^{-5}x^{-2} - 3^{-2}a^{-2}x^{-5}\}.$

597. $\{a^2x - 2^{-1} \times 3^{-2}a^{10}x^{-7} - 18a^{-12}x^5 + a^{-4}x^{-5}\} : \{2^{-1}a^7x^{-2} - 9a^{-7}x^2\}.$

598. $\{a^{-5}x - 3^2 \times 2^{-5}a^{-2} + 2^{-2}a^{-1}x^{-1} - 2^5 \times 3^{-2}x^{-2} + ax^{-5} - 2 \times 3^{-2}a^2x^{-4}\} : \{2^{-5}a^{-5}x^{-2} - 3^{-2}a^{-2}x^{-5}\}.$

599. $\{13 \times 2^{-2} \times 5^{-2}a^{-5}x^{-4} + 5^{-1}a^{-7}x^{-5} - 3^{-1} \times 5a^{-6}x^{-4} + 2^{-5} \times 5a^{-5}x^{-5} + a^{-4}x^{-5} - 2^{-5} \times 3a^{-5}x^{-6} + 5^{-2} \times 2a^{-7}x^{-2} - 3^{-1} \times 2a^{-6}x^{-3}\} : \{5a^{-5}x^{-1} - 3a^{-1}x^{-2} + 2a^{-5}\}.$

§ V.—ELEVACION Á POTENCIAS POSITIVAS DE CANTIDADES CON EXPONENTES NECATIVOS.

600. $\{a^{-7}b^{-5}x^{-5} + c^{-2}d^{-4}z^{-6}\}^2.$

601. $\{3^{-1}a^{-2}c^{-5} + 5^{-2}a^{-3}b^{-1}c^{-2}\}^2.$

602. $\{2^{-1}a^{-2}b^{-5} + 3^{-2}a^{-7}c^{-5}\}^2.$

603. $\{2^{-1}a^5b^2x - a^{-5}b^{-2}x^{-1}\}^2.$

604. $\{2^{-5}a^{-2}b^5x^{-1} - 2^{-4}a^2b^{-1}x^5\}^2.$

605. $\left(\frac{a^{-3}x^{-2}}{b^{-4}c^{-1}}-\frac{a^{-2}d^{-3}}{b^{-1}x^{-7}}\right)^2$.

606. $\left(\frac{2^{-1}a^{2}}{b^{-3}c^{-4}}+\frac{b^{-2}}{2^{-1}a^{-3}c^{-5}x^{-7}}\right)^2$.

607. $\left(\frac{a^{-8}x^{-2}}{b^{-5}y^{-4}}+\frac{2^{-1}c^{-4}y^{-3}}{d^{-1}x^{-2}}+\frac{6^{-2}a^{-5}z^{-7}}{x^{-4}y^{-3}}\right)^2$.

608. $\{a^{-8}b^{-7}+3^{-1}a^{-5}c^{-5}\}^3$.

609. $\{2a^3b^4+3^{-2}a^{-3}b^{-2}\}^3$.

610. $\{3a^{-2}x^4-3^{-1}a^2x^{-4}\}^3$.

611. $\{27a^{-12}x^{-11}+3^{-2}a^{-2}x^{-3}\}^3$.

612. $\{6a^{-7}x^{-9}+2^{-2}a^{-8}x^{-8}+3^{-2}a^{-9}x^{-7}\}^3$.

613. $\{36a^{20}x^{19}+3^{-2}a^{-3}x^{-2}+2^{-1}a^{-2}x^{-1}\}^3$.

614. $\left(\frac{a^{7}x^{-3}}{2^{-1}b^{5}y^{-4}}-\frac{3^{-1}a^{-2}b}{x^{-2}y^{-3}}\right)^3$.

615. $\left(\frac{\{a^{2}b^{-3}+a^{3}b^{-2}\}^2}{\{a^{-2}b^{3}-a^{-3}b^{2}\}^3}+\frac{\{a^{-2}b^{-2}-a^{-3}b^{-3}\}^3}{\{a^{-3}b^{-2}-a^{-2}b^{-3}\}^2}\right)^3$.

616. $\{a^{-3}b^{-2}+x^{-1}y^{-4}\}^4$. **617.** $\{a^{-3}x^{-2}-a^{-1}y^{-4}\}^4$.

618. $\{a^{-3}x^2+a^2x^{-3}\}^4$. **619.** $\{a^{-7}x^4-a^7x^{-4}\}^4$.

620. $\{3a^7x^{-7}-2a^{-7}x^7\}^4$.

621. $\{3a^2x^3+3^{-2}a^{-2}b^{-3}\}^4$.

622. $\{8a^{-2}b^3-2^{-2}a^3x^{-2}\}^4$.

623. $\{10^{-1}b^3x^{-2}-4b^{-3}y^6\}^4$.

ARTICULO II.

Potencias negativas.

§ I. POTENCIAS NEGATIVAS DE CANTIDADES AFECTADAS CON EXPONENTES POSITIVOS.

624. $\{a^3x^2+b^2y^3\}^{-1}$. **625.** $\{a^4x^2+a^3x^3\}^{-1}$.

626. $\{a^7x^2-a^2y^7\}^{-1}$. **627** $\{a^2x^3+5b^3y^2\}^{-1}$.

628. $\{2a^3y^2-3b^2x^3\}^{-1}$. **629.** $\{4a^3x^3+6a^2x^6\}^{-1}$.

630. $\{x+a\}^{-2}$. **631.** $\{x-a\}^{-2}$.

632. $\{a^3x^2+b^2y^3\}^{-2}$. **633.** $\{ab^2+x^3y^4\}^{-2}$.

634. $\{a^7b^3+3x^6y^4\}^{-2}$. **635.** $\{3a^9x^3+b^6y^8\}^{-2}$.

636. $\{2a^{11}x^{10}+3a^7y^8\}^{-2}$. **637.** $\{2a^7x-5a^2x^3\}^{-2}$.

638. $\{3a^3x^4-1\}^{-2}$. **639.** $\{7ax^3-42\}^{-2}$.

640. $\{x+a\}^{-3}$. **641.** $\{x-a\}^{-3}$.

642. $\{a^2x^3+b^4y^3\}^{-3}$. **643.** $\{a^2x^3-a^3x^2\}^{-3}$.

644. $\{3a^2x+ax^3\}^{-3}$. **645.** $\{ax^3-3a^3x\}^{-3}$.

646. $\{2x^3y^4+7x^4y^3\}^{-3}$. **647.** $\{a^7x^3+0,5x^3y^6\}^{-3}$.

648. $\{2x^3y^4-0,6y^5z^6\}^{-3}$.

649 $\{0,2x^5y^5-0,3x^5y^5\}^{-5}$. **650.** $\{x+a\}^{-4}$.

651. $\{5a^5x^2+7b^2y^5\}^{-4}$. **652.** $\{5a^5x^2-7a^2x^5\}^{-4}$.

653. $\{7a^2x^5-5a^5x^2\}^{-4}$. **654.** $\{4a^5b^6-3x^6y^5\}^{-4}$.

655. $\{0,1a^2x^7+10a^7x^2\}^{-4}$.

656. $\{10a^7x^2-0,1a^2x^7\}^{-4}$.

657. $\left\{\frac{2}{3}ax-\frac{5}{2}a^2x^2\right\}^{-4}$. **658.** $\left\{3\sqrt{a}-2\sqrt[3]{a^2}\right\}^{-4}$.

659. $\left\{5\sqrt[4]{a^5+b^5}+7\sqrt[3]{a^2-b^2}\right\}^{-4}$.

§ II.—POTENCIAS NEGATIVAS DE CANTIDADES AFECTADAS CON EXPONENTES TAMBIEN NEGATIVOS.

660. $\{2a^{-5}b^5+3a^5b^{-2}\}^{-1}$.

661. $\{3^{-2}a^5b^{-5}+2a^{-5}b^2\}^{-1}$.

662. $\{5^{-2}ab^{-5}-3^{-5}a^5b^{-1}\}^{-1}$.

663. $\left\{\left\{\frac{2}{3}a^5b^2\right\}^{-2}+\left\{\frac{3}{2}a^2b^5\right\}^{-3}\right\}^{-1}$.

664. $\left\{\left\{2a^5b\right\}^{-1}-\left\{\frac{2}{3}a^4b^3\right\}^{-2}\right\}^{-1}$.

665. $\{5a^{-5}b^{-5}-0,5a^{-5}b^{-4}\}^{-1}$.

666. $\{0,2a^{-7}x^{-8}-0,02b^{-8}y^{-7}\}^{-1}$.

667. $\left\{\sqrt{\{a+b\}^{-1}}-\sqrt[3]{\{a-b\}^{-2}}\right\}^{-1}$

668. $\left\{\sqrt{a^{-2}+b^{-2}}+\sqrt[3]{a^3+b^3}\right\}^{-4}.$

669. $\left\{\sqrt[3]{a^{-2}-b^{-2}}-\sqrt{a^{-3}-b^{-3}}\right\}^{-4}.$

670. $\{2a^{-3}b^{-2}-3^{-2}a^2b^3\}^{-2}.$

671. $\{7^{-3}a^{-2}b-3^{-7}ab^{-2}\}^{-2}.$

672. $\{4^{-3}a^{-2}b^{-4}-7^{-3}a^{-4}b^{-2}\}^{-2}.$

673. $\{6^{-1}a^{-2}x^{-3}+5^{-1}b^{-2}y^{-3}\}^{-2}.$

674. $\left\{\left\{\frac{5}{5}a^3b^3\right\}^{-3}+\left\{\frac{5}{3}a^3b^3\right\}^{-2}\right\}^{-2}.$

675. $\left\{\left\{\frac{1}{2}a^7b^3\right\}^{-4}+\left\{\frac{3}{4}a^7b^4\right\}^{-3}\right\}^{-2}.$

676. $\{0,3a^{-8}b^{-3}-0,7x^{-3}y^{-8}\}^{-2}.$

677. $\{3a^{11}b^{-8}+0,3x^{-8}y^{11}\}^{-2}.$

678. $\left\{\sqrt{a^2+b^2}+\sqrt{a^{-2}+b^{-2}}\right\}^{-2}.$

679. $\left\{\left\{\sqrt[3]{a^2+b^2}\right\}^{-1}-\left\{\sqrt{a^2+b^2}\right\}^{-2}\right\}^{-2}.$

680. $\{10ab^3+7x^{-3}y^{-2}\}^{-3}.$

681. $\{8ab^{11}-5^{-3}x^{-2}y^{-1}\}^{-3}.$

682. $\{5a^{-2}b^3+5^{-3}a^2b^{-3}\}^{-3}.$

683. $\{4^{-2}ab^{-1}-5^{-4}a^{-1}b^2\}^{-3}.$

684. $\{10a^{-2}x^{-3}-0,1a^2y^{-6}\}^{-3}$.

685. $\{\frac{5}{4}a^2x^{-7}-\frac{4}{5}a^{-7}x^2\}^{-3}$.

686. $\{2a^{-5}x^2-\frac{2}{3}b^2y^{-7}\}^{-3}$.

687. $\{0,3a^{-7}x^7-3a^5x^{-5}\}^{-5}$.

688. $\{0,3a^2x^{-2}-\frac{2}{3}b^3y^{-3}\}^{-3}$.

689. $\{3\frac{2}{3}a^2b^2-3,5a^{-2}b^{-2}\}^{-3}$.

690. $\{5a^2x^3+6b^2y^3\}^{-4}$.

691. $\{4a^2x^{-3}-5a^{-3}x^2\}^{-4}$.

692. $\{3a^{-5}b^2-\frac{2}{3}a^{-2}b^5\}^{-4}$

693. $\{\frac{2}{3}a^{-2}b^5-3a^{-5}b^2\}^{-4}$.

694. $\{10a^7x^{-8}-0,1a^{-7}x^8\}^{-4}$.

695. $\{0,1a^{-7}x^8-10a^7x^{-8}\}^{-4}$.

696. $\{0,3a^{-2}x^{-3}-\frac{3}{4}b^{-4}y^{-5}\}^{-4}$.

697. $\{\frac{2}{3}a^5x^{-5}-0,7b^3y^{-3}\}^{-4}$.

698. $\{0,3a^6x^{-2}-0,4b^4y^{-4}\}^{-4}$.

699. $\{0,7a^{-8}x^{-7}-0,07b^{-3}y^{-3}\}^{-4}$.

ARTICULO III.

Operaciones con las cantidades afectadas de exponentes fraccionarios.

§ I.—SUMA.

700. $\left\{a^{\frac{m}{n}}b^{\frac{p}{q}}+a^{\frac{p}{q}}b^{\frac{2m}{n}}\right\}+\left\{a^{\frac{2m}{n}}b^{\frac{p}{q}}-a^{\frac{5p}{q}}b^{\frac{m}{n}}\right\}.$

701. $\left\{a^{\frac{5}{4}}b^{\frac{5}{7}}+a^{\frac{1}{4}}b^{\frac{3}{8}}\right\}+\left\{a^{\frac{5}{4}}b^{\frac{4}{7}}-a^{\frac{1}{4}}b^{\frac{1}{7}}\right\}.$

702. $\left\{\frac{2}{3}a^{\frac{3}{7}}b^{\frac{2}{5}}-\frac{3}{5}a^{\frac{3}{7}}b^{\frac{5}{8}}\right\}+\left\{\frac{2}{7}a^{\frac{3}{8}}b^{\frac{2}{5}}-a^{\frac{2}{7}}b^{\frac{3}{5}}\right\}.$

703. $\left\{2^{\frac{3}{5}}a^{\frac{5}{12}}x^{\frac{6}{15}}-\frac{3}{5}a^{\frac{2}{3}}b^{\frac{5}{7}}\right\}+\left\{3^{\frac{3}{5}}a^{\frac{7}{12}}x^{\frac{7}{15}}+\frac{5}{2}a^{\frac{2}{3}}b^{\frac{5}{7}}\right\}.$

704. $\left\{\left|\frac{m}{n}\right|^{\frac{2}{5}}\left|\frac{p}{q}\right|^{\frac{3}{7}}-\left|\frac{m}{p}\right|^{\frac{3}{4}}\left|\frac{n}{q}\right|^{\frac{5}{7}}\right\}+\left\{\left|\frac{m}{n}\right|^{\frac{3}{7}}\left|\frac{p}{q}\right|^{\frac{2}{5}}-\left|\frac{m}{p}\right|^{\frac{5}{7}}\left|\frac{n}{q}\right|^{\frac{3}{4}}\right\}.$

705. $\left\{\left|\frac{a^3b^2}{x^2y^3}\right|^{\frac{m}{n}}-\left|\frac{a^2x^3}{b^3y^2}\right|^{\frac{n}{m}}\right\}+\left\{\left|\frac{a^3b^2}{x^2y^3}\right|^{\frac{n}{m}}-\left|\frac{a^2x^3}{b^3y^2}\right|^{\frac{m}{n}}\right\}.$

§ II.—RESTA.

706. $\left\{a^{\frac{2}{3}}b^{\frac{3}{2}}+a^{\frac{3}{2}}b^{\frac{2}{3}}\right\}-\left\{a^{\frac{5}{3}}b^{\frac{3}{2}}-a^{\frac{1}{2}}b^{\frac{2}{3}}\right\}.$

707. $\left\{a^{\frac{3}{7}}b^{3}-a^{\frac{5}{4}}b^{2}\right\}-\left\{a^{\frac{3}{7}}b^{3}-a^{\frac{1}{2}}b^{2}\right\}.$

708. $\left\{3a^7b^{\frac{3}{5}}-2a^{\frac{2}{3}}b^3\right\}-\left\{2a^7b^{\frac{2}{5}}-a^{\frac{2}{3}}b^3\right\}$.

709. $\left\{2^{\frac{3}{5}}a^{\frac{2}{3}}b^{\frac{3}{5}}-2a^{\frac{1}{3}}b^{\frac{1}{5}}\right\}-\left\{3^{\frac{3}{5}}a^{\frac{2}{3}}b^{\frac{1}{5}}-7a^{\frac{2}{3}}b^{\frac{2}{5}}\right\}$.

710. $\left\{\left\{a^2+b^2\right\}^{\frac{2}{3}}+\left\{a^2-b^3\right\}^{\frac{3}{4}}\right\}-\left\{\left\{\left\{a^2+b^2\right\}^2\right\}^{\frac{1}{3}}-\left\{\left\{a^2-b^3\right\}^{\frac{1}{4}}\right\}^3\right\}$.

711. $\left\{\left\{a-b\right\}^{\frac{7}{2}}-\left\{a+b\right\}^{\frac{9}{4}}\right\}-\left\{\left\{a-b\right\}^{\frac{3}{2}}-\left\{a+b\right\}^{\frac{5}{4}}\right\}$.

§ III.—MULTIPLICACION.

712. $a^{\frac{2}{5}}b^{\frac{3}{4}}\times a^{\frac{1}{5}}b^{\frac{3}{7}}$. **713.** $a^{\frac{3}{5}}b^{\frac{2}{7}}\times a^{\frac{3}{5}}b^{\frac{7}{2}}$.

714. $3a^2b^{\frac{3}{11}}\times 5a^{\frac{3}{11}}b^2$. **715.** $3^{\frac{4}{5}}a^{\frac{3}{5}}b^{\frac{3}{4}}\times 4^{\frac{1}{2}}a^{\frac{3}{11}}b^{\frac{7}{8}}$.

716. $\left\{\frac{2}{3}\right\}^{\frac{3}{4}}a^{\frac{2}{5}}b^{\frac{1}{3}}\times\left\{\frac{3}{2}\right\}^{\frac{4}{5}}a^{\frac{7}{9}}b^{\frac{9}{11}}$.

717. $0{,}5a^{\frac{3}{5}}b^{\frac{3}{4}}\times -9{,}5a^{\frac{3}{2}}b^{\frac{5}{3}}$.

718. $\left\{a^{\frac{2}{3}}-b^{\frac{3}{4}}\right\}\left\{a^{\frac{3}{5}}-b^{\frac{5}{8}}\right\}$.

719. $\left\{3a^2b^{\frac{3}{5}}-5a^{\frac{2}{3}}b^7\right\}\left\{5a^{\frac{2}{7}}b^5-11a^{11}b^{\frac{2}{9}}\right\}$

720. $\left\{7a^{\frac{3}{4}}b^{\frac{2}{3}}-9a^{\frac{3}{5}}b^{\frac{5}{7}}-7a^{\frac{9}{11}}b^{\frac{7}{8}}\right\}\left\{3a^{\frac{3}{4}}-5b^{\frac{2}{5}}\right\}$.

721. $\left\{2a^{\frac{2}{5}}b^{\frac{5}{7}}-0,5a^{\frac{1}{2}}b^{\frac{2}{3}}-0,7a^{\frac{3}{11}}b^{\frac{1}{9}}\right\}\left\{0,2a^{\frac{3}{4}}b^{\frac{5}{7}}-10a^{\frac{1}{10}}b^{\frac{1}{9}}\right\}$.

722. $\left\{3^{\frac{2}{3}}a^{\frac{5}{5}}-0,07a^{\frac{3}{4}}b^{\frac{4}{3}}-9^{\frac{2}{5}}ab^{\frac{3}{4}}\right\}\left\{5^{\frac{2}{3}}a^{3}-2^{\frac{3}{5}}b^{2}\right\}$.

723. $\left\{\{a+b\}^{\frac{2}{3}}+\{a-b\}^{\frac{3}{4}}\right\}\left\{\{a+b\}^{\frac{2}{3}}-\{a-b\}^{\frac{3}{4}}\right\}$.

724. $\left\{\{a+b\}^{\frac{2}{3}}-\{a-b\}^{\frac{3}{4}}\right\}\left\{\{a+b\}^{\frac{3}{4}}-\{a-b\}^{\frac{2}{3}}\right\}$.

725. $\left\{\{a^3-b\}^{\frac{2}{5}}-\{a-b^3\}^{\frac{2}{5}}\right\}\left\{\{a^3-b\}^{\frac{2}{5}}-\{a-b^3\}^{\frac{2}{5}}\right\}$.

§ IV. — DIVISIÓN.

726. $a^{\frac{27}{20}}b^{\frac{94}{65}}:a^{\frac{3}{5}}b^{\frac{5}{7}}$. **727.** $35a^{\frac{9}{8}}b^{\frac{29}{18}}c:5a^{\frac{3}{8}}b^{\frac{5}{6}}c$.

728. $18a^{0,27}b^{2,15}:9a^{0,07}b^{2,1}$.

729. $5^{-1}a^{2,45}b^{\frac{15}{15}}c^{4,1}:5^{-3}a^{0,15}b^{\frac{2}{3}}c^{0,1}$.

730. $\left\{2000^{\frac{1}{6}}a^{\frac{11}{6}}b-15^{\frac{1}{2}}ab^{\frac{7}{6}}-1024^{\frac{1}{6}}a^{\frac{15}{6}}b^{\frac{5}{6}}+12^{\frac{1}{2}}a^{\frac{4}{3}}b\right\}:\left\{2^{\frac{2}{5}}a^{\frac{5}{2}}b^{\frac{1}{5}}-3^{\frac{1}{2}}a^{\frac{2}{5}}b^{\frac{1}{2}}\right\}$.

731. $\left\{24a^{\frac{5}{6}}b^{\frac{7}{6}}c-2^{\frac{7}{2}}a^{\frac{1}{5}}b^{\frac{3}{2}}c^{\frac{2}{5}}+3^{\frac{4}{3}}abc^{5}-72^{\frac{1}{6}}a^{\frac{1}{2}}b^{\frac{4}{3}}c^{\frac{8}{3}}\right\} : \left\{3a^{\frac{1}{2}}b^{\frac{2}{5}}c-2^{\frac{1}{2}}bc^{\frac{2}{5}}\right\}.$

732. $\left\{108^{\frac{1}{4}}a^{\frac{4}{5}}b^{\frac{45}{55}}-2^{\frac{7}{6}}a^{\frac{7}{6}}b^{\frac{56}{55}}-8968066875^{\frac{1}{20}}a^{\frac{20}{21}}b^{\frac{35}{55}}+128000^{\frac{1}{15}}a^{\frac{11}{14}}b^{\frac{26}{55}}\right\} : \left\{3^{\frac{3}{4}}a^{\frac{2}{5}}b^{\frac{4}{5}}-2^{\frac{2}{5}}a^{\frac{1}{2}}b^{\frac{3}{5}}\right\}.$

733. $\{0,06a^{1,57}b^{1,25}+0,009a^{1,09}b^{0,13}-8a^{0,9}b^{1,7}-1,2a^{0,42}b^{0,6}\} : \{0,03a^{1,07}b^{0,05}-4a^{0,4}b^{0,5}\}.$

734. $\left\{2\times 12814453125^{-12}a^{\frac{1}{12}}b^{\frac{1}{5}}-3^{-\frac{4}{5}}a^{\frac{3}{2}}b^{-\frac{4}{5}}-5^{-\frac{3}{2}}a^{-\frac{4}{3}}b^{\frac{6}{5}}\right\} : \left\{5^{-\frac{3}{4}}a^{-\frac{2}{3}}b^{\frac{3}{5}}-3^{-\frac{2}{3}}a^{\frac{3}{4}}b^{-\frac{2}{5}}\right\}.$

735. $\left\{2^{-3}a^{-\frac{4}{7}}b^{-\frac{8}{5}}-3^{-\frac{8}{5}}a^{\frac{4}{5}}b^{\frac{4}{5}}\right\} : \left\{2^{-\frac{3}{2}}a^{-\frac{2}{7}}b^{-\frac{4}{5}}+3^{-\frac{4}{5}}a^{\frac{2}{5}}b^{\frac{2}{5}}\right\}.$

§ V.—ELEVACIÓN Á POTENCIAS.

736. $\left\{3a^{\frac{2}{3}}b^{\frac{3}{5}}\right\}^{2}$.

737. $\left\{3^{\frac{2}{5}}a^{\frac{3}{4}}b^{\frac{3}{5}}\right\}^{2}$.

738. $\left\{5^{\frac{2}{3}}a^{\frac{3}{2}}b^{\frac{5}{4}}\right\}^{2}$.

39. $\left\{\left\{\frac{5}{5}\right\}^{\frac{3}{2}}a^{\frac{2}{3}}b^{\frac{3}{4}}\right\}^{2}$.

740. $\left\{\left\{\frac{3}{4}\right\}^{-\frac{4}{3}}a^{\frac{3}{2}}b^{\frac{2}{3}}+4a^{\frac{3}{5}}b^{\frac{7}{8}}\right\}^{2}$.

741. $\left\{a^{\frac{2}{3}}-b^{\frac{3}{2}}\right\}^{2}$.

742. $\left\{3^{\frac{5}{5}}a^{\frac{5}{5}}x^{\frac{2}{7}}-\left\{\frac{2}{5}\right\}^{\frac{3}{4}}b^{\frac{6}{7}}y^{\frac{7}{9}}\right\}^{2}$.

743. $\left\{0,7a^{-\frac{5}{4}}b^{\frac{1}{2}}-\left\{\frac{2}{5}\right\}^{\frac{5}{8}}a^{\frac{5}{4}}b^{-\frac{1}{2}}\right\}^{2}$.

744. $\left\{3a^{\frac{1}{2}}-2b^{\frac{1}{5}}\right\}^{5}$. **745.** $\left\{3^{\frac{2}{9}}a^{\frac{7}{8}}b^{\frac{5}{7}}-\left\{\frac{3}{4}\right\}^{\frac{7}{9}}x^{\frac{7}{11}}y^{\frac{5}{5}}\right\}^{3}$.

746. $\left\{0,3a^{-\frac{2}{5}}b^{\frac{5}{4}}-3x^{\frac{5}{5}}y^{-\frac{5}{3}}\right\}^{3}$.

747. $\left\{\left\{\frac{5}{4}\right\}^{-\frac{1}{3}}a^{5}x^{-\frac{5}{4}}-\left\{\frac{1}{2}\right\}^{-\frac{3}{5}}b^{-\frac{3}{4}}y^{\frac{4}{5}}\right\}^{4}$.

748. $\left\{\left\{\frac{5}{8}\right\}^{-4}a^{\frac{5}{5}}b^{\frac{7}{8}}-\left\{\frac{5}{5}\right\}^{\frac{3}{4}}x^{\frac{7}{9}}y^{\frac{5}{8}}\right\}^{4}$.

749. $\left\{0,5a^{\frac{5}{2}}x^{\frac{2}{5}}-0,7a^{\frac{1}{2}}y^{\frac{3}{7}}\right\}^{4}$.

750. $\left\{2a^{2}x^{5}+3b^{5}y^{2}\right\}^{\frac{5}{2}}$. **751.** $\left\{5ax^{5}-3b^{5}y\right\}^{\frac{4}{5}}$.

752. $\left\{7a^{2}x^{5}+3a^{5}x^{2}\right\}^{\frac{5}{5}}$.

753. $\left\{7a^{\frac{5}{4}}x^{\frac{4}{5}}-5b^{\frac{1}{2}}y^{\frac{2}{3}}\right\}^{\frac{2}{5}}$.

754. $\left\{3a^{0,2}x^{0,05}+0,2a^{0,5}y^{0,5}\right\}^{\frac{1}{2}}$.

755. $\left\{a^{0,5}b^{0,05}-0,7x^{0,01}y^{0,5}\right\}^{0,2}$.

756. $\left\{0{,}5a^{0{,}3}b^{\frac{2}{3}}-3x^{0{,}7}y\right\}^{0{,}05}$.

757. $\left\{3^{0{,}3}a^{0{,}7}x^{0{,}2}-2^{0{,}05}b^{0{,}05}y^{0{,}7}\right\}^{-\frac{3}{4}}$.

758. $\left\{3^{\frac{3}{4}}a^{0{,}7}b^{\frac{3}{7}}-0{,}5x^{\frac{4}{9}}y^{0{,}2}\right\}^{-\frac{5}{7}}$

759. $\left\{3^{-0{,}5}a^{-0{,}7}b^{-0{,}3}+4^{0{,}7}x^{-0{,}8}y^{-0{,}05}\right\}^{-0{,}2}$.

760. $\left\{10a^{-0{,}2}b^{2}-0{,}1a^{0{,}2}b^{-2}\right\}^{-0{,}3}$.

761. $\left\{10^{-0{,}3}a^{-0{,}1}x^{-0{,}2}-0{,}2^{-0{,}5}a^{-0{,}4}b^{-0{,}6}\right\}^{-0{,}7}$

CAPITULO VII.

ECUACIONES Y SISTEMAS DETERMINADOS DE ECUACIONES DE PRIMER GRADO.

ARTICULO I.

Ecuacion determinada de primer grado.

762. $x-27=27-2x$. **763.** $5x+15=106-2$

764. $96x-13=1738-7x$.

765. $18x+188=13-17x$.

766. $37x+2874=1936-97x$.

767. $834-7x=7062+512x$.

768. $\frac{2}{3}x+42\frac{2}{3}x=\frac{1573}{21}-\frac{5}{7}x$.

769. $\frac{17}{5}x-\frac{3}{4}=\frac{7}{16}x+236\frac{1}{4}$.

770. $3\frac{7}{8}x-4\frac{5}{12}=25\frac{39}{40}-\frac{7}{15}x$.

771. $37\frac{1}{2}x-11\frac{1}{4}=-121\frac{1}{8}+\frac{7}{8}x$.

772. $7x-4-11x=x+27-3x.$

773. $\frac{2x}{3}-5+\frac{4x}{7}=\frac{5x}{8}-3-\frac{x}{24}.$

774. $0,7x+0,36-0,043x=48-0,5x.$

775. $\frac{2}{3}x-0,07x+x-48=99,3-\frac{0,4x}{0,7}.$

776. $3\frac{3}{4}x+28-\frac{x}{0,7}=96-\frac{5x}{7}-0,8x.$

777. $\frac{0,3x}{7}+\frac{2,7x}{5}-8x=12x-\frac{0,4-8x}{170,007}.$

778. $\dfrac{17\frac{5}{4}x}{\dfrac{17-\frac{3}{4}}{5\frac{7}{8}}}-\dfrac{23-\frac{5}{7}}{\dfrac{9\frac{5}{4}}{8\frac{5}{9}}}+\dfrac{5x}{\dfrac{15-\frac{5}{8}}{14-\frac{5}{7}}}=\dfrac{128}{9165}$

$$\times\frac{12787895577}{49049\times3627}.$$

779. $\dfrac{5\frac{2}{3}}{\dfrac{3-\frac{5}{4}}{5-\frac{2}{5}}}x-\dfrac{2\frac{3}{5}}{\dfrac{3-\frac{1}{2}}{7-\frac{3}{4}}}-\dfrac{2\frac{1}{4}}{\dfrac{3-\frac{1}{5}}{7-\frac{5}{5}}}x-\dfrac{3123}{3125}$

$$-\frac{7167}{7168}=\frac{1435567807}{9\times3125\times512}.$$

780. $\dfrac{3-\frac{5}{7}}{\dfrac{5\frac{7}{8}}{4\frac{3}{7}}}x-\dfrac{3\frac{1}{4}}{\dfrac{5-\frac{5}{5}}{12-\frac{3}{4}}}+\dfrac{4\frac{7}{9}}{\dfrac{12-\frac{3}{7}}{5-\frac{8}{9}}}x=0.$

781. $$\frac{2^5-\frac{5}{2^2}}{3^2+\frac{2}{5^3}}x-\frac{5-\frac{5}{2^2}}{5^3+\frac{5}{5^2}}=\{2^5\times3^5-3^4\}\{2^5\times3^5+3^4\}-\frac{(5\times2^2\times5^3-5\times5^3)(5^4\times2^2\times5^3+5\times5^3)}{(5^3\times5^3\times2^2+5\times2^2)(5^2\times5^3\times2^2-5\times2^2)}.$$

782. $$ax+b-\{x+d\}=a^2+b^2+dx-b^2.$$

783. $$\frac{a}{b}x-\frac{c}{d}+\frac{e}{f}x=\frac{g}{h}x-\frac{l}{m}-\frac{px}{q}.$$

784. $$\frac{a^3}{b}x+\frac{b^3}{a}-\frac{b^3}{a}x=\frac{a}{b^3}-x+\{a^3-b^3\}x.$$

785. $$\frac{a+b}{a-b}x-\{a+b\}=\frac{c-d}{a+b}x-d.$$

786. $$\frac{a+b}{a-b}x-\frac{c+d}{a+b}=\frac{c-d}{a-b}x+a^2+b^2.$$

787. $$\frac{a^2}{b^3}x-\frac{b^3}{a^2}-\frac{a}{b^2}x-\frac{b^2}{a}=\frac{a^4}{b^3}x+\frac{b^3}{a^4}-\frac{a^3}{b^2}x+\frac{b^2}{a^3}.$$

788. $$\frac{1}{a}x-\frac{1}{b}+\frac{1}{a^2}x-\frac{1}{b^2}=\frac{1}{b^3}x+\frac{1}{a^3}-\frac{1}{b^2}x+\frac{1}{a^2}.$$

789. $$\frac{a}{b}x-\frac{a^2}{b^2}+1=\frac{b}{a}x+\frac{b^2}{a^2}+2.$$

790. $$\frac{a}{a+b}x-\frac{b}{a-b}-1=1-\frac{a}{a-b}x+\frac{b}{a+b}.$$

791. $$\frac{a}{(a+b)^2}x-\frac{a}{(a-b)^2}=\frac{a}{a^2-b^2}-\frac{a}{(a-b)^2}x.$$

792. $$\frac{a^4}{a+b}x-\frac{a^3}{a-b}=\frac{a^2}{a^2+b^2}-\frac{a}{a^2-b^2}x.$$

793. $$\frac{a+b}{a-b}x+\frac{a-b}{a+b}=\frac{a^2+b^2}{a^2-b^2}-\frac{a^2-b^2}{a^2+b^2}x.$$

794. $$\frac{a+b}{(a-b)^3}x-\frac{a-b}{(a+b)^2}=\frac{(a+b)^2}{a^2-b^2}-\frac{(a-b)^3}{a^2+b^2}x$$

795. $\frac{(a+b)^2}{(a-b)^3}x-\frac{(a-b)^2}{(a+b)^3}=\frac{(a-b)^3}{(a^2-b^2)^2}-\frac{(a-b)^3}{(a+b)^3}x.$

796. $\frac{1}{(a+b)^2}x-\frac{1}{a^2-b^2}-a+b=a-b-\frac{1}{(a-b)^2}x+\frac{1}{a^2-b^2}.$

797. $\frac{a+\frac{1}{a}}{a-\frac{1}{a}}x-\frac{a-\frac{1}{a}}{a+\frac{1}{a}}=\frac{\frac{1}{a}-a}{a+\frac{1}{a}}x+\frac{a+\frac{1}{a}}{a-\frac{1}{a}}.$

798. $\frac{a+\frac{1}{b}}{a-\frac{1}{b}}x-\frac{b+\frac{1}{a}}{b-\frac{1}{a}}=\frac{a-\frac{1}{b}}{a+\frac{1}{b}}x+\frac{b-\frac{1}{a}}{b+\frac{1}{a}}.$

799. $\frac{1+\frac{1}{a}}{1-\frac{1}{a}}x-\frac{1-\frac{1}{a}}{1+\frac{1}{a}}=\frac{1+\frac{1}{a}}{1-\frac{1}{a}}-\frac{1-\frac{1}{a}}{1+\frac{1}{a}}x.$

800. $\frac{1+\frac{1}{a}}{1-\frac{1}{a}}x-\frac{1+\frac{1}{b}}{1-\frac{1}{b}}=\frac{1-\frac{1}{a}}{1+\frac{1}{a}}-\frac{1-\frac{1}{b}}{1+\frac{1}{b}}x.$

801. $\frac{a+\frac{b}{a}}{a-\frac{b}{a}}x-\frac{1+\frac{1}{b}}{1-\frac{1}{b}}=\frac{1-\frac{1}{b}}{1+\frac{1}{b}}-\frac{a-\frac{b}{a}}{a+\frac{b}{a}}x.$

ARTICULO II.

Sistemas determinados de ecuaciones de primer grado con dos incógnitas.

802. $x+y=5,$
$x-y=1.$

803. $x-y=4.$
$y-x=-4.$

804. $x+y=1.$
$x-y=5.$

805. $x+y=2.$
$y-x=8.$

806. $2x+3y=7.$
$3x-2y=4.$

807. $2x+3y=22.$
$2y+3x=23.$

808. $3x+2y=13.$
$15x-8y=29.$

809. $2x-5y=-7.$
$6x-11y=-9.$

810. $5x+6y=37.$
$10x-3y=44.$

811. $5x+6y=13.$
$10x-3y=56.$

812. $4x-5y=-7.$
$3y-10x=-11.$

813. $13x+30y=97.$
$59x+49y=2.$

814. $\frac{2}{x}+\frac{3}{y}=-4.$
$\frac{3}{y}-\frac{3}{x}=-7.$

815. $\frac{2}{3}x+\frac{3}{4}y=11.$
$\frac{2}{7}x-\frac{3}{8}y=6.$

816. $\frac{5+5x}{8}+\frac{3y}{9}=\frac{7}{8}-\frac{11+7x}{7}.$
$\frac{8x-5}{3}+\frac{3}{11}=\frac{15y}{15}-\frac{4x-2}{5}.$

817. $\frac{5-13x}{2}-\frac{4-7y}{3}=113-\frac{17y-11}{4}.$
$\frac{4x}{3}-\frac{5}{6}=\frac{7-12y}{5}+112.$

818. $\frac{4x+\frac{3y}{5}}{8-\frac{3}{8}}-\frac{5}{9}=\frac{5-3x}{2}+\frac{4-5y}{3}.$
$\frac{3x+2y}{5}-\frac{5+2y}{3}=\frac{8-3x}{5}-\frac{3x}{4}.$

819.
$$\begin{aligned} 0{,}5x+2{,}3y&=4.\\ 0{,}2x-2{,}5y&=3{,}4. \end{aligned}$$

820.
$$\begin{aligned} 2{,}3+7{,}2y+\tfrac{7}{9}&=\tfrac{5}{6}-0{,}07x.\\ 0{,}03x-\tfrac{2}{5}&=\tfrac{0{,}2x-0{,}5y}{5}. \end{aligned}$$

821.
$$\frac{0{,}5+\frac{2}{5}x}{8}+\frac{y-0{,}7}{3}=\frac{\frac{2}{5}x-0{,}2y}{0{,}3}-\frac{7}{8}.$$

$$\frac{\frac{2}{7}x+\frac{7}{9}y}{0{,}3+\frac{5}{7}}-0{,}27=0{,}27x-\frac{5y}{0{,}2}.$$

822.
$$\begin{aligned} \{a+b\}x+\{a-b\}y&=a+b.\\ \{a-b\}x-\{a+b\}y&=a-b. \end{aligned}$$

823.
$$\begin{aligned} \tfrac{ax}{b}+\tfrac{by}{a}&=\tfrac{a^2}{b}.\\ \tfrac{bx}{a}-\tfrac{ay}{b}&=\tfrac{b^2}{a}. \end{aligned}$$

824.
$$\begin{aligned} \tfrac{a}{a+b}x+\tfrac{b}{a-b}y&=a^2+b^2.\\ \tfrac{a}{a-b}x-\tfrac{b}{a+b}y&=b^2-a^2. \end{aligned}$$

825.
$$\begin{aligned} \tfrac{a+b}{a-b}x+\tfrac{a-b}{a+b}y&=1.\\ \tfrac{a-b}{a+b}x-\tfrac{a+b}{a-b}y&=2. \end{aligned}$$

826.
$$\frac{a+\frac{a}{a-b}}{b-\frac{b}{a+b}}x+\frac{a-\frac{a}{a-b}}{b+\frac{b}{a+b}}y=a-1.$$

$$\frac{a+b+\frac{a}{a+1}}{a-b-\frac{a}{a-1}}x-\frac{a-b-\frac{a}{a-1}}{a+b+\frac{a}{a+1}}y=a+1.$$

827.
$$\frac{a+1+\frac{a+1}{a}}{a-1-\frac{a-1}{b}}x+\frac{a+1-\frac{a+1}{b}}{a-1+\frac{a-1}{a}}y=a+b.$$

$$\frac{a-1-\frac{a-1}{b}}{a+1+\frac{a+1}{a}}x+\frac{a-1+\frac{a-1}{a}}{a+1-\frac{a+1}{b}}y=a-b.$$

ARTICULO III.

Sistemas determinados de ecuaciones de primer grado con tres incógnitas.

828.
$$\begin{aligned} 3x+2y+z&=12.\\ 2x+3y-z&=10.\\ x+2y-3z&=9. \end{aligned}$$

829.
$$\begin{aligned} x+y+z&=6.\\ x+y&=0.\\ x-y&=14. \end{aligned}$$

830.
$$\begin{aligned} 3x+2y+5z&=3.\\ 5x+3y-2z&=25.\\ 2x-5y-3z&=2. \end{aligned}$$

831.
$$\begin{aligned} 2x+3y+4z&=20.\\ 3x+2y-4z&=18.\\ 5x+3y+2z&=22. \end{aligned}$$

832.
$$\begin{aligned} x+2y+7z&=11.\\ 2x+y+5z&=13.\\ 5x+7y+z&=17. \end{aligned}$$

833.
$$\begin{aligned} 2x+3y+4z&=-1,8.\\ 3x+4y-2z&=-2,1.\\ 4x+3z&=8,15. \end{aligned}$$

834.
$$\begin{aligned} \tfrac{x}{3}+\tfrac{y}{4}+\tfrac{z}{3}&=\tfrac{119}{90}.\\ \tfrac{x}{3}+\tfrac{y}{5}-\tfrac{z}{5}&=\tfrac{25}{15}.\\ \tfrac{x}{4}-\tfrac{y}{5}-\tfrac{z}{4}&=\tfrac{11}{60}. \end{aligned}$$

835.
$$\begin{aligned} \tfrac{2}{5}x+\tfrac{5}{4}y-\tfrac{5}{6}z&=4.\\ \tfrac{3}{2}x-\tfrac{3}{4}y+\tfrac{5}{6}z&=7.\\ \tfrac{3}{2}x-\tfrac{2}{3}y-\tfrac{2}{3}z&=5. \end{aligned}$$

836.
$$\begin{aligned} 0,5x+0,04y+0,003z&=1,132.\\ 0,04x+0,005y-0,3z&=-1,105.\\ 0,003x-0,4y-0,05z&=-1,394. \end{aligned}$$

837.

$$\frac{x}{0,5}+\frac{y}{0,04}+\frac{z}{0,005}=2.$$
$$\frac{x}{0,005}+\frac{y}{0,4}-\frac{z}{0,05}=3.$$
$$\frac{x}{0,05}-\frac{y}{0,004}-\frac{z}{0,5}=4.$$

838.

$$\frac{0,5}{x}+\frac{0,005}{y}+\frac{0,05}{z}=27,75.$$
$$\frac{0,05}{x}+\frac{0,5}{y}-\frac{0,005}{z}=22,75.$$
$$\frac{0,005}{x}-\frac{0,05}{y}-\frac{0,5}{z}=-252,475.$$

839.

$$3x+\frac{2}{5}y+0,4z=\frac{46}{5}.$$
$$\frac{2}{5}x+7y-0,05z=-\frac{131,25}{5}.$$
$$0,4x-\frac{0,07}{2}y-7z=22,74.$$

840.

$$\frac{1}{2}x+\frac{1}{3}y+\frac{1}{4}z=6.$$
$$0,2x+0,3y+0,1z=3.$$
$$x+y+z=11.$$

841.

$$\frac{2}{a}x+\frac{3}{b}y+\frac{5}{c}z=1.$$
$$\frac{a}{2}x+\frac{b}{3}y-\frac{c}{5}z=2.$$
$$\frac{a}{b}x-\frac{a}{c}y-\frac{c}{b}z=3.$$

842.

$$\frac{a}{a+1}x+\frac{b}{a-1}y+\frac{a}{a+b}z=b.$$
$$\frac{b}{a-b}x+\frac{a}{b-a}y-\frac{b}{a-1}z=a.$$
$$\frac{x}{a+b}-\frac{y}{a-b}-\frac{z}{a+1}=1.$$

843.
$$\frac{a+1}{a-1}x+\frac{a-1}{a+1}y+\frac{a^2+1}{a^2-1}z=1.$$
$$\frac{b+1}{b-1}x+\frac{b-1}{b+1}y+\frac{b^2+1}{b^2-1}z=a.$$
$$\frac{c+1}{c-1}x+\frac{c-1}{c+1}y+\frac{c^2+1}{c^2-1}z=b.$$

844.
$$\frac{a+1}{a-1}x+\frac{b+1}{b-1}y+\frac{c+1}{c-1}z=abc.$$
$$\frac{a-1}{a+1}x+\frac{b-1}{b+1}y+\frac{c-1}{c+1}z=a^2.$$
$$\frac{a^2+1}{a^2-1}x+\frac{b^2+1}{b^2-1}y+\frac{c^2+1}{c^2-1}z=b^2.$$

845.
$$\frac{a+b}{a-b}x+\frac{a-b}{a+b}y+\frac{a^2+b^2}{a^2-b^2}z=a.$$
$$\frac{a+b}{a^2-b^2}x+\frac{a^2+b^2}{a+b}y+\frac{a^2+b^2}{a-b}z=b^2.$$
$$\frac{a^2-b^2}{a^2+b^2}x+\frac{a^2+b^2}{a^2-b^2}y+\frac{a+b}{a-b}z=c^2.$$

846.
$$\frac{a+b}{a-b}x+\frac{a+b}{a^2-b^2}y+\frac{a^2-b^2}{a^2+b^2}z=a.$$
$$\frac{a-b}{a+b}x+\frac{a^2+b^2}{a+b}y+\frac{a-b}{a^2+b^2}z=b.$$
$$\frac{a^2-b^2}{a^2+b^2}x+\frac{a^2+b^2}{a^2-b^2}y+\frac{a+b}{a-b}z=1.$$

ARTICULO IV.

Sistemas determinados de cuatro ecuaciones de primer grado.

847.
$$x+y+z=12.$$
$$y+z+u=10.$$
$$x+y-z=8.$$
$$y-z-u=-4.$$

848.
$$x+y+z+u=10.$$
$$x+y+z-u=8.$$
$$x+y-z-u=4.$$
$$x-y-z-u=-2.$$

849.
$$x+2y+z+3u=-5.$$
$$2x+y+3z-u=9.$$
$$x+3y-2z-u=-4.$$
$$3x-y-z-2u=6.$$

850.

$$2x+3y+z+u=5.$$
$$3x-y+2z+u=-3.$$
$$2x-y+3z-u=-1.$$
$$x+y-3z-3u=12.$$

851.

$$2x+y+3z+u=6.$$
$$x+2y+3z+u=7.$$
$$3x+2y+z+u=8.$$
$$2x+y+z+u=9.$$

852.

$$2x+3y-2z-3u=8.$$
$$3x-2y+3z-2u=6.$$
$$5x+y-2z+3u=7.$$
$$4x+2y+3z+3u=14.$$

853.

$$x+2y+z+3u=24.$$
$$2x-3y+z-2u=-1.$$
$$3x-2y-3z+u=6.$$
$$5x-5y+2z-2u=13.$$

854.

$$\frac{2}{x}+\frac{3}{y}+\frac{1}{z}+\frac{1}{u}=8.$$
$$\frac{1}{x}+\frac{2}{y}+\frac{1}{z}-\frac{3}{u}=15.$$
$$\frac{3}{x}+\frac{1}{y}-\frac{2}{z}-\frac{1}{u}=16.$$
$$\frac{1}{x}-\frac{2}{y}-\frac{1}{z}-\frac{3}{u}=7.$$

855.

$$\frac{x}{2}+\frac{y}{3}+\frac{z}{5}+\frac{u}{4}=72.$$
$$\frac{2}{3}x+\frac{3}{4}y+\frac{3}{5}z+\frac{5}{7}u=158.$$
$$\frac{3}{4}x+\frac{5}{6}y-\frac{2}{3}z-\frac{3}{2}u=-165.$$
$$\frac{2}{5}x-\frac{3}{2}y-\frac{4}{5}z-\frac{2}{5}u=-62.$$

856.

$$0{,}5x+1{,}04y+2{,}003z+3{,}0002u=116{,}8174.$$
$$1{,}5x+2{,}04y+3{,}003z-4{,}0002u=54{,}8106.$$
$$2{,}02x+3{,}003y-4{,}0004z-5{,}00005u=-59{,}55105.$$
$$4{,}00004x-3{,}0003y-2{,}002z-1{,}01u=-30{,}2109.$$

857.

$$0{,}05x+0{,}025y+0{,}003z+0{,}7u=-2{,}785.$$
$$0{,}002x+0{,}03y+0{,}0007z-0{,}03u=-0{,}1265.$$
$$0{,}2x+0{,}03y-0{,}004z-0{,}0005u=1{,}6825.$$
$$0{,}0004x-0{,}003y+0{,}02z-0{,}1u=0{,}634.$$

858.

$$0{,}2x+0{,}03y+0{,}004z+0{,}0005u=2{,}595.$$
$$0{,}06x+0{,}005y+0{,}0004z-0{,}3u=0{,}996.$$
$$0{,}005x+0{,}04y-0{,}3z-0{,}0002u=1{,}1504.$$
$$0{,}0004x-0{,}003y-0{,}02z-0{,}1u=0{,}164.$$

859.

$$\frac{x}{a}+\frac{y}{a^2}+\frac{z}{a^3}+\frac{u}{a^4}=1.$$
$$\frac{x}{b}+\frac{y}{b^2}+\frac{z}{b^3}-\frac{u}{b^4}=2.$$
$$\frac{x}{c}+\frac{y}{c^2}-\frac{z}{c^3}-\frac{u}{c^4}=3.$$
$$\frac{x}{a}-\frac{y}{b}-\frac{z}{c}-\frac{u}{c^2}=4.$$

860.

$$\frac{x}{a^2+b^2}+\frac{y}{a^2-b^2}+\frac{z}{a+b}+\frac{u}{a-b}=a.$$
$$\frac{x}{a+1}+\frac{y}{a^2+b^2}+\frac{z}{a-1}+\frac{u}{a^2-b^2}=b.$$
$$\frac{x}{a-1}+\frac{y}{a^2-b^2}+\frac{z}{a+1}+\frac{u}{a^2+b^2}=a^2.$$
$$\frac{x}{a^2-1}+\frac{y}{a^2+1}+\frac{z}{a+1}+\frac{u}{a-1}=b^2.$$

861.

$$\frac{a+\frac{a}{b}}{a-\frac{a}{b}}x+\frac{b+\frac{b}{a}}{b-\frac{b}{a}}y+\frac{1+\frac{1}{a}}{1-\frac{1}{a}}z+\frac{1+\frac{1}{b}}{1-\frac{1}{b}}u=a.$$

$$\frac{b+\frac{b}{a}}{b-\frac{b}{a}}x+\frac{1+\frac{1}{a}}{1-\frac{1}{a}}y+\frac{1+\frac{1}{b}}{1-\frac{1}{b}}z+\frac{a+\frac{a}{b}}{a-\frac{a}{b}}u=b.$$

$$\frac{1+\frac{1}{a}}{1-\frac{1}{a}}x+\frac{1+\frac{1}{b}}{1-\frac{1}{b}}y+\frac{a+\frac{a}{b}}{a-\frac{a}{b}}z+\frac{b+\frac{b}{a}}{b-\frac{b}{a}}u=a^2.$$

$$\frac{1+\frac{1}{b}}{1-\frac{1}{b}}x+\frac{a+\frac{a}{b}}{a-\frac{a}{b}}y+\frac{b+\frac{b}{a}}{b-\frac{b}{a}}z+\frac{1+\frac{1}{a}}{1-\frac{1}{a}}u=b^2.$$

862.

$$\frac{a+\frac{1}{a}}{b-\frac{1}{b}}x+\frac{a-\frac{1}{a}}{b+\frac{1}{b}}y+\frac{a+\frac{1}{a^2}}{b-\frac{1}{b^2}}z+\frac{a-\frac{1}{a^2}}{b+\frac{1}{b^2}}u=a^2.$$

$$\frac{a-\frac{1}{a}}{b+\frac{1}{b}}x+\frac{a+\frac{1}{a^2}}{b-\frac{1}{b^2}}y+\frac{a-\frac{1}{a^2}}{b+\frac{1}{b^2}}z+\frac{a+\frac{1}{a}}{b-\frac{1}{b}}u=b^2.$$

$$\frac{a+\frac{1}{a^2}}{b-\frac{1}{b^2}}x+\frac{a-\frac{1}{a^2}}{b+\frac{1}{b^2}}y+\frac{a+\frac{1}{a}}{b-\frac{1}{b}}z+\frac{a-\frac{1}{a}}{b+\frac{1}{b}}u=a^3.$$

$$\frac{a-\frac{1}{a^2}}{b+\frac{1}{b^2}}x+\frac{a+\frac{1}{a}}{b-\frac{1}{b}}y+\frac{a-\frac{1}{a}}{b+\frac{1}{b}}z+\frac{a+\frac{1}{a^2}}{b-\frac{1}{b^2}}u=b^3.$$

ARTICULO V.

Sistemas determinados de cinco ecuaciones.

863.

$$x+y+z+u+v=3.$$
$$x+y+z-u=4.$$
$$x+y-z=-2.$$
$$x-y-z=0.$$
$$y-z-v=0.$$

864.

$$x+y+z=2.$$
$$y+z+u=-1.$$
$$z+u+v=3.$$
$$x+y+v=3.$$
$$z+u+v=3.$$

865.

$$x+y+z+u+v=93.$$
$$x+y+z+u-v=47.$$
$$x+y+z-u-v=9.$$
$$x+y-z-u-v=-33.$$
$$x-y-z-u-v=-67.$$

866.

$$x+y+2z+3u+4v=-16.$$
$$x+2y+3z+4u-v=27.$$
$$2x+3y+4z-u-v=73.$$
$$3x+4y+z-u-2v=77.$$
$$4x+y-z-2u-3v=64.$$

867.

$$3x+4y+5z+u+v=5\tfrac{5}{6}.$$
$$2x+y+z+4u+3v=4\tfrac{59}{60}.$$
$$6x+9y+z-8u-12v=-1\tfrac{7}{20}.$$
$$9x-8y+10z-2u+9v=10.$$
$$5x+2y+5z+6u+9v=11\tfrac{5}{6}.$$

868.

$$1\tfrac{1}{2}x+2\tfrac{1}{5}y+3\tfrac{1}{4}z+4\tfrac{1}{5}u+5\tfrac{1}{6}v=\tfrac{227}{60}.$$
$$2\tfrac{2}{5}x+3\tfrac{3}{4}y+4\tfrac{4}{5}z+5\tfrac{5}{6}u-6\tfrac{6}{7}v=\tfrac{2183}{150}.$$
$$3\tfrac{5}{7}x+5\tfrac{5}{6}y+4\tfrac{4}{5}z-3\tfrac{3}{4}u-2\tfrac{2}{5}v=\tfrac{17325}{420}.$$
$$1\tfrac{1}{6}x+2\tfrac{2}{5}y-3\tfrac{3}{4}z-2\tfrac{2}{5}u-1\tfrac{1}{2}v=\tfrac{115}{60}.$$
$$2\tfrac{2}{5}x-5\tfrac{2}{5}y-3\tfrac{2}{7}z-7\tfrac{5}{6}u-6\tfrac{1}{2}v=\tfrac{209}{55}.$$

869.

$$2\tfrac{3}{4}x+3,5y+3z+\tfrac{2}{3}u+7v=-\tfrac{7}{12}.$$
$$3x+5\tfrac{3}{4}y+2,07z+3\tfrac{1}{2}u-0,005v=71,61.$$
$$\tfrac{2}{3}x+3y+2\tfrac{3}{4}z-0,07u-4\tfrac{2}{3}v=12,35.$$
$$2,3x+\tfrac{3}{7}y-\tfrac{5}{6}z-2u-\tfrac{3}{5}v=\tfrac{667,5}{21}.$$
$$x-y-\frac{5,2}{8}z-\frac{0,25}{4}u-\frac{7,006}{0,25}v=20,3404.$$

$a^3x+b^2y=c^2-d^3z.$

$a^2y-b^2z=b^3-c^2u.$

$d^3u+c^3v=a^3-b^2z.$

870. $a^3x+b^3y+c^3z+d^3u+f^3v=m^4+b^3x+a^3y+d^3z+c^3u-v.$

$a^2x-y+c^2z-u+d^2v=x-b^2y+z-c^2u+v+m^3.$

871.

$$\frac{a}{a+b}x+\frac{b}{a-b}y+\frac{a}{a-b}z+\frac{b}{a+b}u+\frac{a}{a^2-b^2}v=\frac{3a^2+3a-2ab+b^2}{a^2-b^2}.$$

$$\frac{a}{a-b}x+\frac{b}{a+b}y+\frac{a}{a+b}z+\frac{b}{a-b}u-\frac{a}{a^2-b^2}v=\frac{3a^2-3a-4ab-b^2}{a^2-b^2}.$$

$$\frac{a}{a^2-b^2}x+\frac{a}{a-b}y+\frac{b}{a-b}z-\frac{a}{a+b}u-\frac{b}{a-b}v=\frac{a^2+a-4ab+b^2}{a^2-b^2}.$$

$$\frac{b}{a^2-b^2}x+\frac{a}{a+b}y-\frac{b}{a+b}z-\frac{a}{a-b}u-\frac{b}{a+b}v=\frac{a^2-2ab+b+5b^2}{a^2-b^2}.$$

$$\frac{b}{a+b}x-\frac{a}{a^2-b^2}y-\frac{a}{a-b}z-\frac{b}{a+b}u-\frac{a}{a-b}v=\frac{-3a^2+a-2ab-3b^2}{a^2-b^2}.$$

CAPITULO VIII.

ECUACIONES INDETERMINADAS Y MAS QUE INDETERMINADAS DE PRIMER GRADO.

ARTICULO I.

Ecuacion indeterminada de primer grado.

§ I.—HALLAR EN NÚMEROS ENTEROS, Y SI ES POSIBLE POSITIVOS, UNA SOLUCION DE LAS ECUACIONES SIGUIENTES POR EL MÉTODO DIRECTO.

872. $39x+119y=903$. **873.** $127x+137y=665$

874. $390x+730y=1290$.

875. $30030x+1938y=510$.

876. $102102x+76038y=18352620$.

877. $221x+551y=12090$.

878. $1062347x+8415539y=7956850$.

879. $247x+26071y=50$.

880. $2405x+7007y=13650$.

881. $53475x+11339y=833750$.

882. $89x+29y=870$. **883.** $97x+870y=203$.

884. $103x+503y=1024.$

885. $833x-107y=1040.$

886. $2550x-509y=635.$

887. $113x-207y=753.$

§ II. — HALLAR EN NÚMEROS ENTEROS, Y SIEMPRE QUE SEA POSIBLE POSITIVOS, UNA SOLUCION DE LA ECUACION INDETERMINADA DE PRIMER GRADO CON DOS INCÓGNITAS POR MEDIO DE LAS FRACCIONES CONTÍNUAS.

888. $248x+755y=111.$

889. $123x+532y=211$

890. $711x+118y=43.$

891. $413x+512y=1101.$

892. $219x+902y=157.$

893. $511x+213y=500.$

894. $43x+25y=512.$ **895.** $49x+64y=121.$

896. $173x+17y=683.$ **897.** $18x+11y=343.$

898. $49x-18y=125.$ **899.** $93x-77y=1007.$

900. $89x-13y=877.$

901. ¿Cuál es el valor de t necesario para que el de x sea décuplo que el de y?

902. $78x-23y=9.$

903. ¿Qué valor ha de tomar t para que el de y sea triplo del de x?

904. $25x-7y=-97$.

905. ¿Cuál es el valor de t que hace que el de y sea los $\frac{21}{2}$ del de x?

ARTICULO II.

Sistemas de ecuaciones indeterminadas de primer grado.

§ I.—DOS ECUACIONES CON TRES INCÓGNITAS.

906.
$$2x+3y+5z=37.$$
$$11x+7y+6z=101.$$

907.
$$11x+13y+15z=199.$$
$$15x+11y-13z=193.$$

908.
$$8x+3y+5z=48.$$
$$7x+5y+11z=69.$$

909.
$$15x+16y+13z=86.$$
$$35x+12y+11z=92.$$

910.
$$3x+2y+8z=17.$$
$$2x+3y+16z=23.$$

911.
$$17x-12y+19z=266.$$
$$102x+81y+95z=771.$$

912.
$$77x+54y-143z=-256.$$
$$33x-8y+65z=302.$$

913.
$$57x-35y-13z=5.$$
$$19x-15y+26z=86.$$

914.
$$27x+44y+121z=1246.$$
$$18x-33y+22z=46.$$

915.
$$55x-13y-12z=337.$$
$$22x-39y+8z=-67.$$

§ II.—TRES ECUACIONES CON CUATRO INCÓGNITAS.

916.
$$7x-3y+5z-2u=16.$$
$$2y-3x+5u-7z=0.$$
$$2x+3y+7z+5u=83.$$

917.
$$8x+7y+5z+11u=104.$$
$$6x+5y-3z-13u=14.$$
$$7x-4y-3z-5u=-11.$$

918.
$$11x-3y+13z-2u=178.$$
$$3y-7x+11u-13z=-66.$$
$$13x+7y-3z-11u=92.$$

919.
$$17x+19y+23z+7u=307.$$
$$7x-19y+17z-11u=-111.$$
$$3x-13y-11z+7u=7.$$

920.
$$x+2y-3z+4u=28.$$
$$4x+y+3z+2u=70.$$
$$3x+4y+z-2u=42.$$

921.
$$4x+5y+3z-2u=25.$$
$$3x+2y+4z+2u=38.$$
$$3x-3y-z+u=-2.$$

922.
$$3x+y+2z+u=29.$$
$$x-2y+z+2u=12.$$
$$2x+3y-z-u=7.$$

923.
$$2x+3y+z+u=78.$$
$$2x+3y-z+u=54.$$
$$2x+3y+z-u=52.$$

924.
$$x+y+z+u=73.$$
$$x+y+z-u=37.$$
$$x+y-z-u=3.$$

925.
$$5x+y+3z+u=30.$$
$$x+5y+z-3u=6.$$
$$3x-5y+3z-5u=-22.$$

926.
$$2x+3y+4z+5u=-3.$$
$$3x+4y+5z-2u=13.$$
$$4x+5y-2z-3u=1.$$

§ III.—CUATRO ECUACIONES CON CINCO INCÓGNITAS.

927.
$$3x-2y+5z-3u+2v=10.$$
$$x-3y+z-2u+3v=0.$$
$$5x+2y+3z+u-5v=12.$$
$$x+y-2z-3u+v=-4.$$

928.
$$2x+3y+4z+5u+7v=75.$$
$$2x-3y+5z-4u-7v=-40.$$
$$7x+2y+3z-4u-5v=-21.$$
$$7x-4y-3z+5u-2v=0.$$

929.
$$x+y+z+u+v=15.$$
$$x+y+z+u-v=13.$$
$$x+y+z-u-v=9.$$
$$x+y-z-u-v=3.$$

930.
$$x+2y+3z+5u+v=51.$$
$$2x+y+3z+5u-v=38.$$
$$x+5y+2z-3u-v=4.$$
$$2x+5y-z-5u-v=-16.$$

931.
$$x+2y-z+3u-v=-1.$$
$$2x+y+z-5u-3v=114.$$
$$3x+2y-z-2u+3v=33.$$
$$2x+2y-3z-3u+5v=-1.$$

932.
$$5x+4y+7z+2u-v=81.$$
$$3x+4y+z+6u+v=63.$$
$$2x+3y-2z-3u+2v=-16.$$
$$x+6y-4z+3u-2v=31.$$

ARTICULO III.

Ecuaciones más que indeterminadas de primer grado.

§ I.—ECUACION MÁS QUE INDETERMINADA.

933. $9x+11y+13z=367.$

934. $5x+17y-9z=30.$

935. $23x-25y-31z=54.$

936. $7x-12y-18z=-434.$

937. $6x+15y+10z=37.$

938. $33x+55y+15z=703.$

939. $22x+12y+33z=48.$

940. $45x+36y+20z=144.$

941. $78x-182y+21z=33.$

942. $91x-195y+105z=585.$

943. $91x+143y+56z=1001.$

944. $3x+5y+7z+11u=78.$

945. $5x+6y+3z+7u=96.$

946. $3x-2y+5z-7u=29.$

947. $2x-6y+15z-35u=-15.$

948. $11x-23y+12z-24u=736.$

§ II.—SISTEMAS MÁS QUE INDETERMINADOS DE DOS ECUACIONES.

949.
$$2x+3y+4z+5u=-3.$$
$$3x+4y+5z+2u=5.$$

950.
$$2x+3y+2z+3u=-11.$$
$$2x-3y+2z-3u=55.$$

951.
$$18x-9y+14z-7u=117.$$
$$12x-4y+9z-3u=68.$$

952.
$$18x+7y-3z+11u=67.$$
$$11x-13y+2z-9u=-45.$$

953.
$$22x-15y+11z-7u=73.$$
$$17x-8y+14z-6u=65.$$

954.
$$3x-7y+2z-4u=-7.$$
$$5y-7x+2u-3z=1.$$

§ III.—DE TRES ECUACIONES.

955.
$$x+y+z+u+v=32.$$
$$2x+3y+2z+3u-v=82.$$
$$3x+2y+3z+2u=78.$$

956.
$$x+y+z+u+v=4.$$
$$x+y+z+u-v=-4.$$
$$x+y+z-u-v=2.$$

957.
$$x+y+z+u+v=3.$$
$$x-y+z-u+v=9.$$
$$y-x+u-z+v=-3.$$

958.
$$x+y+z+u+v=1.$$
$$x+y+z-u-v=11.$$
$$x-y-z-u-v=1.$$

959.
$$x+y+z+u+v=3.$$
$$x+2y+z-2u+v=8.$$
$$2x-y+2z-u+v=12.$$

960
$$2x+3y+z+2u+v=0.$$
$$3x-2y+z-u+2v=15.$$
$$x+y-2z+3u-v=-13.$$

961.
$$2x+y+2z+u+3v=9.$$
$$x-2y+z-3u+2v=-1.$$
$$3x-2y+z-3u+v=0.$$

CAPITULO IX.

SISTEMAS SINGULARES DE ECUACIONES DE PRIMER GRADO.

ARTICULO I.

Sistemas de ecuaciones de primer grado que parecen determinados y no lo son.

962. $7x+13y=53.$
$161x+299y=1219.$

963. $5x+2y=3.$
$10x+4y=6.$

964. $253x+1771y=2024.$
$x+7y=8.$

965. $4199x+3553y=1292.$
$13x+11y=4.$

966. $7x+9y=43.$
$4669x+6003y=28681.$

967. $6x-19y=43.$
$2346x-7429y=16813.$

968. $23x-37y=14.$
$299x-481y=182.$

969. $\frac{2}{3}x+8-\frac{3}{4}y=16-\frac{7}{8}x-\frac{3}{2}y.$
$15\frac{1}{5}x+184-17\frac{1}{4}y=368-20\frac{1}{8}x-34\frac{1}{2}y.$

970.
$$\tfrac{5}{7}x-7+\tfrac{4}{11}y=48+\tfrac{7}{9}x-\tfrac{2}{7}y.$$
$$12\tfrac{1}{7}x-119+6\tfrac{2}{11}y=816+13\tfrac{2}{9}x-4\tfrac{6}{7}y.$$

971.
$$\tfrac{7}{11}x-12+\tfrac{12}{13}y=29-\tfrac{3}{4}x+\tfrac{5}{7}y.$$
$$26x+4y=779-\tfrac{15}{44}x+\tfrac{3}{91}y.$$

972.
$$6\tfrac{2}{5}x-\tfrac{3}{5}+7\tfrac{8}{9}y=48-4\tfrac{3}{4}x-5\tfrac{3}{5}y.$$
$$147x+174y-7\tfrac{4}{5}=624-1\tfrac{5}{12}x-1\tfrac{16}{45}y.$$

973.
$$2x+3y+5z=63.$$
$$7x+11y+13z=192.$$
$$25x+39y+49z=702.$$

974.
$$4x+3y-5z=16.$$
$$5x-3y+4z=44.$$
$$18x+27y-43z=24.$$

975.
$$17x+2y+13z=204.$$
$$13x-8y+5z=132.$$
$$40x+19y+38z=516.$$

976.
$$23x-8y+z=68.$$
$$2x+17y-19z=-42.$$
$$113x-57y+24z=382.$$

977.
$$111x-322y+5z=-518.$$
$$39x-11y+91z=290.$$
$$6x+289y+268z=1388.$$

978.
$$37x-23y-13z=-95.$$
$$19x-13y-11z=-85.$$
$$83x-51y-27z=-195.$$

979.
$$\begin{aligned} x+y+3z&=-22.\\ x+y+7z&=-50.\\ x+y+11z&=-78. \end{aligned}$$

980.
$$\begin{aligned} x+y-13z&=71.\\ x+y-23z&=121.\\ x+y-17z&=91. \end{aligned}$$

981.
$$\begin{aligned} x-y+5z&=30.\\ x-y+7z&=40.\\ x-y+11z&=60. \end{aligned}$$

982.
$$\begin{aligned} x-y-3z&=3.\\ x-y-8z&=-2.\\ x-y-17z&=-11. \end{aligned}$$

983.
$$\begin{aligned} x+17y-z&=176.\\ x-23y-z&=-144.\\ x+11y-z&=128. \end{aligned}$$

984.
$$\begin{aligned} x-53y+z&=-143.\\ x-28y+z&=-68.\\ x-13y+z&=-23. \end{aligned}$$

985.
$$\begin{aligned} 3x+5y+7z&=0.\\ 11x+2y+3z&=0.\\ 4x+5y+7\tfrac{1}{49}z&=0. \end{aligned}$$

986.
$$\begin{aligned} x-3y+2z&=0.\\ 3x-2y+z&=0.\\ 16x+y-3z&=0. \end{aligned}$$

987.
$$\begin{aligned} 11x-3y-2z&=0.\\ 3x-11y-2z&=0.\\ 13x-y-2z&=0. \end{aligned}$$

988.
$$\begin{aligned} 3x+5y+9z&=0.\\ 2x+3y+7z&=0.\\ 10x+17y+29z&=0. \end{aligned}$$

989.
$$\begin{aligned} 5x-23y+11z&=0.\\ 4x-7y-11z&=0.\\ 31x-154y+88z&=0. \end{aligned}$$

990.
$$12x+y+13z=0.$$
$$x-12y+z=0.$$
$$95x+20y+103z=0.$$

ARTICULO II.

Sistemas indeterminados que parecen más que determinados.

991.
$$7x-3y=43.$$
$$35x-15y=215.$$
$$42x-18y=258.$$

992.
$$13x-18y=7.$$
$$195x-270y=105.$$
$$494x-684y=266.$$

993.
$$11x+13y=168.$$
$$31x+16y=504-2x-23y.$$
$$20\tfrac{2}{5}x+16\tfrac{1}{4}y=336-\tfrac{4}{5}x-\tfrac{39}{4}y.$$

994.
$$27x-13y=29.$$
$$459x-221y=493.$$
$$837x-403y=899.$$

995.
$$17x-5y=49.$$
$$221x-65y=637.$$
$$323x-95y=931.$$

996.
$$3\ \tfrac{2}{5}x-8+7\tfrac{5}{4}y=9\tfrac{5}{7}x-4\tfrac{5}{6}y+17\tfrac{17}{140}.$$
$$47\tfrac{5}{8}x-112+108\tfrac{1}{2}y=136x-67\tfrac{2}{3}y+239,7.$$
$$9\ \tfrac{5}{11}x-21\tfrac{9}{11}+21\tfrac{5}{22}y=26\tfrac{38}{77}x-13\tfrac{2}{11}y+46\tfrac{107}{154}.$$

997.
$$\tfrac{28}{5}x-3=\tfrac{31}{4}y-9.$$
$$9\tfrac{1}{11}x-12\tfrac{8}{11}y-1\tfrac{9}{11}=1\tfrac{4}{11}y-1\tfrac{1}{11}x-12\tfrac{8}{11}.$$
$$\tfrac{7}{12}x-\tfrac{49y+7}{60}=-0,07x+\tfrac{7}{80}y-\tfrac{49}{60}.$$

998.

$$\frac{5}{3}x+\frac{3}{4}y+2z=38.$$
$$\frac{4}{5}x+7y+\frac{7z}{6}=99\frac{11}{30}.$$
$$\frac{20}{7}x+\frac{9}{7}y+\frac{24}{7}z=65\frac{1}{7}.$$
$$3x+\frac{105}{4}y+\frac{35z}{8}=\frac{2981}{8}.$$

999.

$$17x+21y-13z=56.$$
$$13x-17y+21z=-178.$$
$$193x+7y+69z=-910.$$
$$11x+245y-225z=1582.$$

1000.

$$2x+7y+11z=43.$$
$$7x-3y+42z=-80.$$
$$\frac{64}{33}x+\frac{37}{154}y+11\frac{1}{2}z=-\frac{6091}{462}.$$
$$\frac{46}{33}x-\frac{257}{154}y+8\frac{1}{2}z=-\frac{11509}{462}.$$

1001.

$$\frac{3}{11}x+\frac{21}{22}y+\frac{3}{2}z=\frac{129}{22}.$$
$$\frac{5}{3}x-\frac{5}{7}y+10z=-\frac{400}{21}.$$
$$9x+4y+53z=-37.$$
$$5x-10y+31z=-123.$$

1002.

$$91x-119y+147z=-1246.$$
$$15x+2y+4z=-61.$$
$$2x+19y-17z=117.$$
$$51x+63y-39z=168.$$

1003.

$$\frac{13}{2}x+\frac{23}{5}y-\frac{17}{3}z=-57.$$
$$\frac{11}{3}x-\frac{13}{5}y+\frac{25}{7}z=78.$$
$$\frac{61}{6}x+2y-\frac{50}{21}z=21.$$
$$\frac{85}{6}x+36y-\frac{940}{21}z=-675.$$

ARTICULO III.

Ecuaciones incompatibles.

1004.
$$17x+23y=188.$$
$$187x+253y=8.$$

1005.
$$89x+98y=837.$$
$$1157x+1274y=102.$$

1006.
$$13x+30y=97.$$
$$169x+390y=17.$$

1007.
$$37x-23y=8.$$
$$481x-299y=83.$$

1008.
$$91x-13y=102.$$
$$1547x-221y=7.$$

1009.
$$\tfrac{3}{7}x-\tfrac{7}{3}y=\tfrac{5}{4}.$$
$$\tfrac{6}{33}x-\tfrac{14}{15}y=8.$$

1010.
$$3x+2y+5z=8.$$
$$8x+7y+5z=9.$$
$$11x+9y+10z=23.$$

1011.
$$17x+3y-8z=15.$$
$$15x-3y+11z=43.$$
$$32x+3z=17.$$

1012.
$$13x-15y+9z=8.$$
$$7x+11y-3z=51.$$
$$20x-4y+6z=3.$$

1013.
$$8x-11y+5z=13.$$
$$12x-6y+13z=8.$$
$$48x-45y+41z=2.$$

1014.
$$11x+13y-2z=8.$$
$$7x+9y+13z=6.$$
$$48x+56y-23z=5.$$

ARTICULO IV.

Sistemas de ecuaciones compatibles más que determinados.

1015.
$$9x-13y=20.$$
$$7x+2y=13.$$
$$39x-20y=79.$$

1016.
$$13x+7y=47.$$
$$5x+7y=31.$$
$$59x-7y=97.$$

1017.
$$49x-11y=153.$$
$$12x+5y=-1.$$
$$37x-16y=154.$$

1018.
$$5x+7y=32.$$
$$9x-4y=41.$$
$$8x+61y=101.$$

1019.
$$17x+9y=96.$$
$$11x+3y=48.$$
$$63x+39y=384.$$

1020.

$$2x+3y+5z=53.$$
$$17x+11y-4z=67.$$
$$23x-14y+17z=132.$$
$$8x+19y+33z=331.$$

1021.

$$31x+13y-41z=254.$$
$$18x-37y+4z=259.$$
$$37x-27y+7z=292.$$
$$19x+39y+83z=-432.$$

1022.

$$11x+37y+39z=73.$$
$$19x-17y+27z=-117.$$
$$37x-9y-8z=135.$$
$$23x+19y-17z=255.$$

1023.

$$17x-83y+2z=207.$$
$$35x-9y-37z=105.$$
$$23x-29y-37z=189.$$
$$13x-55y-37z=287.$$

1024.

$$107x+93y+43z=1449.$$
$$93x+107y-28z=1521.$$
$$107x-93y-91z=787.$$
$$93x-107y-109z=613.$$

1025.

$$5\tfrac{3}{4}x+7\tfrac{3}{5}y+z=131.$$
$$7\tfrac{3}{8}x-\tfrac{y}{2}+5z=101.$$
$$5\tfrac{2}{5}x+4\tfrac{2}{7}y-\tfrac{z}{3}=85\tfrac{4}{21}.$$
$$\tfrac{x}{6}+\tfrac{y}{5}+\tfrac{z}{9}=4\tfrac{1}{3}.$$

1026.

$$\frac{7x}{5}+\frac{5y}{2}+\frac{5z}{3}=329.$$
$$\frac{x}{3}+\frac{7y}{5}+\frac{9z}{2}=602.$$
$$\frac{7x}{2}+\frac{5y}{3}+\frac{11z}{5}=524.$$
$$8x-\frac{7y}{50}+\frac{8z}{15}=537.$$

1027.

$$\frac{15}{2}x+\frac{25}{5}y-\frac{17}{3}z=-57.$$
$$\frac{11}{5}x-\frac{15}{3}y+\frac{25}{7}z=78.$$
$$\frac{3}{8}x-\frac{7}{15}y+9z=188\frac{11}{12}.$$
$$\frac{5}{6}x-3y+\frac{7}{9}z=6\frac{1}{3}.$$

CAPITULO X.

ECUACIONES DE SEGUNDO GRADO.

ARTICULO I.

Ecuacion de segundo grado con una sola incógnita.

1028. $x^2-42x+437=0.$

1029. $x^2-33x+272=0.$

1030. $x^2-53x+690=0.$

1031. $x^2-69x+1058=0.$

1032. $x^2+93x+1922=0.$

1033. $x^2+87x+1682=0.$

1034. $x^2+129x+3698=0.$

1035. $x^2+150x+5000=0.$

1036. $x^2+84x-3136=0.$

1037. $x^2-243x-7290=0.$

1038. $x^2+11x-1302=0.$

1039. $x^2-9x-10692=0.$

1040. $27x^2+72x-432-522x=162x-63x^2+378x-3132.$

1041. $3x^2-\frac{9x}{2}+1,2x^2-\frac{9x}{0,7}-\frac{51x}{14}-\frac{0,25x}{3}+\frac{0,25}{2}-\frac{0,1x}{3}+\frac{5}{14}+\frac{4,25}{42}=-0,03x^2+\frac{0,09x}{2}-0,012x^2+\frac{0,09x}{0,7}+\frac{0,51x}{14}-\frac{1785x}{500}+\frac{1785}{200}-\frac{715,2x}{300}+\frac{1783}{70}+\frac{30511}{4200}.$

1042. $\frac{5x^2+2}{2}+\frac{5x-1}{3}+\frac{x(x+11)}{2}=\frac{x}{8}-\frac{2}{5}.$

1043. $97x^2-2x+513=5x-83x^2-729.$

1044. $\frac{8x^2+7}{3}+\frac{x-1}{8}+27=\frac{x-12}{6}+\frac{1-5x^2}{4}-\frac{27}{8}.$

1045. $\frac{328}{x}-2+97x=3-108x-\frac{512}{x}.$

1046. $\frac{2x^2}{3}-x+\frac{x^2}{15}-\frac{0,4x}{3}+\frac{7x^2}{5}-\frac{70,2x}{3}-10x+15-x+2-35x+351+\frac{5x^2}{3}-\frac{5x}{2}+\frac{x^2}{6}=\frac{x}{3}-\frac{35x^2}{6}+\frac{117x}{2}+24x-36+\frac{12x}{5}-4,8+84x-842,4-6x+9-\frac{3x}{5}+1,2-21x+210,6.$

1047. $\frac{x^2}{15}+\frac{8x}{5}-\frac{x^2}{55}+x-\frac{x^2}{10}-\frac{544x}{165}+\frac{7x}{3}+56-\frac{7x}{11}+35-\frac{7x}{2}-\frac{2408}{33}=-\frac{x^2}{18}-\frac{4x}{3}+\frac{x^2}{66}-\frac{5x}{6}+\frac{x^2}{12}+\frac{172x}{99}+\frac{10x}{9}+\frac{80}{3}-\frac{10x}{33}+\frac{50}{3}-\frac{5x}{3}-\frac{3440}{99}.$

1048. $2{,}5x+20+0{,}25x+40-12{,}5x-138+1{,}25x^2+10x+0{,}125x^2+20x-6{,}25x^2-69x+4x+32+0{,}4x=-64+20x-220{,}8-0{,}1x^2-0{,}8x-0{,}01x^2-1{,}6x-0{,}5x^2+5{,}52x+3{,}8x+30{,}4+0{,}38x+60{,}8-19x-209{,}76.$

1049. $94+3x-6+5x^2-8=12-3x+11+7x^2.$

1050. $\frac{3x^2}{5}-8+\frac{5x}{3}-\frac{11}{6}=9-\frac{5x}{12}+8.$

1051. $0{,}23-2{,}3x^2+7-3x+2=2{,}5-3{,}25x^2+12-0{,}3x.$

1052. $\frac{5}{4}x-0{,}25+\frac{x^2}{8}+\frac{5x}{6}=8-\frac{x}{0{,}2}-\frac{5}{8}+\frac{x}{0{,}02}.$

1053. $\frac{x^2}{18}+\frac{4x}{5}-\frac{9}{8}+\frac{3x}{20}-\frac{x^2}{50}-6+\frac{5x}{24}+\frac{15}{16}-\frac{x}{8}+5=0.$

1054. $3x^2-4{,}5x+\frac{6}{5}x^2-\frac{90}{7}x-\frac{51}{14}x-\frac{1}{12}x+\frac{1}{8}-\frac{1}{30}x+\frac{5}{14}+\frac{17}{168}=\frac{3}{100}x^2+\frac{9}{200}x-\frac{3}{250}x+\frac{9}{70}+\frac{51}{1400}x+\frac{1795}{300}x-\frac{1795}{200}+\frac{3586}{150}x-\frac{1795}{70}-\frac{50481}{4200}.$

1055. $\frac{x^2}{6}-8x+\frac{x^2}{12}+6x-\frac{x^2}{10}-\frac{3x}{2}-\frac{x}{20}+48-x=72-\frac{6x}{5}-18-\frac{3}{5}-\frac{10x}{3}+80-\frac{5x}{3}-120+31.$

1056. $\frac{x^2}{35}+\frac{11x}{5}+\frac{3x^2}{5}+\frac{x^2}{10}-\frac{62x}{5}-\frac{3x}{7}-33-9x-\frac{5x}{2}+186=-\frac{x^2}{14}-\frac{11x}{2}-\frac{3x^2}{2}-\frac{x^2}{4}+31x^2-\frac{10x}{7}-110-35x-5022.$

1057. $\frac{5x^2}{80}+\frac{x^2}{240}+\frac{7x}{80}+\frac{x^2}{560}-x+240x+\frac{80x}{5}+560+\frac{80x}{7}-6400=-\frac{5x^2}{10}-\frac{x}{30}-\frac{7x}{10}-\frac{x}{70}+8x+213x+\frac{71x}{5}+497+\frac{71x}{7}-5680.$

1058. $6x^2-\frac{5x}{4}-\frac{2x^2}{5}+16x-\frac{15}{8}=x-24-9x+\frac{3x^2}{5}-\frac{x}{8}-\frac{x^2}{15}+\frac{8x}{5}.$

1059. $2x^2-\frac{6x}{11}-\frac{5x}{4}=\frac{22x^2}{5}-\frac{9}{44}-\frac{11x}{4}.$

1060. $\frac{5x^2}{4}+30x+\frac{5x^2}{6}-54x+24+\frac{2x}{5}-44+\frac{7x^2}{4}=-42x-\frac{7x^2}{6}+77x-35x-840-\frac{70x}{5}+1540.$

1061. $2{,}1x^2+\frac{9x}{4}+10{,}5x^2+\frac{21x}{8}-105{,}675x+6{,}3x+\frac{27}{4}+31{,}5x+\frac{65}{8}-317{,}025=-4{,}9x^2-\frac{21x}{4}-24{,}5x^2-\frac{49x}{8}+246{,}575x-49{,}7x-\frac{215}{4}-248{,}5x-\frac{497}{8}+2500{,}975.$

1062. $\frac{9x^2}{4}+25+\frac{16x^2}{9}+64+\frac{12521}{4}+15x-4x^2+24x+\frac{15x}{4}+\frac{3x^2}{5}-\frac{333x}{2}-\frac{40x}{5}+80+\frac{25x}{2}=-\frac{25x^2}{16}-36-\frac{x^2}{25}+16x+615+\frac{64x}{5}+\frac{10x^2}{5}-184x+\frac{8x^2}{15}+96-\frac{16x}{5}+888+15x-\frac{x^2}{2}+\frac{555x}{4}+\frac{125x}{5}-666.$

1063. $9x^2-4374x+25+144x-3888+121x^2+64-5346x+81x^2+59049+198x^2=-30x-66x^2-48x-54x^2+1348x-80-90x+2430-176x.$

1064. $\frac{2x^2}{5} - \frac{1}{5} + 5x + \frac{4x+1}{2} + \frac{7x}{4} + \frac{5-45x^2}{15} + \frac{5}{2} - \frac{5x^2}{27} + 3x = -\frac{9x}{10} - 1 + 4x^2 + \frac{7x^2}{8} + \frac{1675x}{270} + 5x + 3 - 7x^2.$

1065. $\frac{3x^2}{5} + \frac{5x}{3} + 5x^2 + 8 - \frac{5x^2}{4} - 3x = \frac{x^2}{6} - 7x + \frac{6x^2+24}{3} + \frac{x}{5} - x - \frac{3}{5} + \frac{5-10x}{5} + 3x^2.$

1066. $\frac{x^2}{2} + \frac{x}{3} + 3 + 7x - \frac{7x}{4} = 5x + \frac{8x+3}{8} - 11x^2 - 7x + \frac{48x+19}{8}.$

1067. $90x^2 + \{15a - 114\}x - 15a^2 - 7a + 36 = 0.$

1068. $1000x^2 - 1800ax + 3270x - 1150a^2 + 1439a + 224 = 0.$

ARTICULO II.

Sistemas determinados de ecuaciones de segundo grado.

1069.
$$\frac{x^2+5}{5} + \frac{y}{7} - 8 = \frac{x^2+y}{2} - 3y.$$
$$\frac{x^2+5}{3} + \frac{x^2+y}{4} = \frac{x^2-5}{2} - 3y^2.$$

1070.
$$\frac{x^2+y}{3} - \frac{y}{5} + \frac{5}{5} = \frac{5}{3} - \frac{y}{2} - \frac{x^2}{3}.$$
$$\frac{x^2+y^2}{2} + \frac{y}{5} = \frac{5}{4} - \frac{y}{6}.$$

1071.
$$\frac{x^2+y^2}{2} + \frac{y}{5} = \frac{x^2-y^2}{3} + \frac{11}{6}.$$
$$\frac{x^2+y}{3} + \frac{3x^2}{2} = \frac{x^2-y+20}{3}.$$

1072.
$$3x^2 + \frac{3y+5}{2} + 8 = \frac{x^2-y}{3} + \frac{101}{6}.$$
$$\frac{x^2+y^2}{2} + \frac{x^2-y^2}{3} + 5 = \frac{2x^2-3y^2}{2} + \frac{25}{2}.$$

1073. $x^2+5xy+y^2+2x+y+1=0.$
$x^2+5xy+y^2+3x+y+1=0.$

1074. $x^2+5xy+y^2+2x+y+1=0.$
$2x^2+15xy+2y^2+6x+2y+2=0.$

ARTICULO III.

Ecuaciones bicuadradas.

1075. $x^4-41x^2+400=0.$

1076. $x^4-949x^2+44100=0.$

1077. $x^4-1088x^2+65536=0.$

1078. $x^4-1700x^2+160000=0.$

1079. $104329x^4-10474x^2+225=0.$

1080. $59049x^4-45522x^2+5929=0.$

1081. $3644281x^4-1283266x^2+38025=0.$

1082. $15625x^4-6850x^2+441=0.$

1083. $81x^4-29290x^2+17689=0.$

1084. $64x^4-4121x^2+1600=0.$

1085. $x^4-142x^2-288=0.$

1086. $x^4+729x^2-65610=0.$

1087. $x^4-83521=0.$

1088. $x^4+289x^2-167042=0.$

1089. $x^4-867x^2-334084=0.$

1090. $4x^4+2023x^2-167042=0.$

1091. $x^4-272x^2-4913=0.$

1092. $x^4+5x^2+6=0.$

1093. $x^4+20x^2+96=0.$

1094. $x^4+30x^2+216=0.$

1095. $625x^4+750x^2+216=0.$

1096. $35x^4+468x^2+1225=0.$

1097. $6x^4+13x^2+6=0.$

1098. $\frac{x^2-5}{5}-\frac{5-x^2}{7}+\frac{7}{x^2}=\frac{9}{x^2}+\frac{x^2-7}{5}-\frac{x^2-5}{7}.$

1099. $\frac{x^2-5}{2}+\frac{x^2+1}{x^2-1}+\frac{x+5}{x-1}=\frac{x-5}{x+1}+\frac{x^2+2}{x^2-1}+\frac{x+1}{x-1}+\frac{6x}{x^2-1}.$

1100. $\frac{5x}{x+5}+\frac{x^2-1}{x^2-9}-\frac{x-5}{x+5}=\frac{x^4}{x^2-9}-\frac{7-5x}{x-5}-\frac{5x}{x^2-9}.$

1101. $\frac{2x}{x+5}+\frac{5}{x^2-25}+\frac{x+2}{x-5}+\frac{2(x+5)}{x^2-25}=\frac{5(x+2)}{x^2-25}+\frac{5x+2}{x+5}+\frac{x^2}{2}+\frac{9x}{x^2-25}.$

1102. $x^4+\frac{x^2+7}{5}+\frac{8-x^2}{6}+\frac{7}{2}=\frac{x^4}{8}+\frac{7-x^2}{6}+\frac{x^2}{5}.$

1103. $\frac{x^3+1}{3}+\frac{x-1}{4}+\frac{11}{x}=\frac{x+3}{6}+\frac{8}{x}-\frac{5}{4}.$

CAPITULO XI.

FRACCIONES CONTINUAS.

ARTICULO I.

Desarrollar en fraccion contínua cada una de las ordinarias siguientes:

1104. $\frac{5}{5}$. **1105.** $\frac{50}{45}$. **1106.** $\frac{40}{41}$. **1107.** $\frac{222}{41}$.

1108. $\frac{844}{345}$. **1109.** $\frac{987}{876}$. **1110.** $\frac{987}{765}$.

1111. $\frac{729}{845}$. **1112.** $\frac{987}{654}$. **1113.** $\frac{1122}{2125}$.

1114. $\frac{998}{1985}$. **1115.** $\frac{985}{588}$. **1116.** $\frac{815}{2095}$.

1117. $\frac{259}{158}$. **1118.** $\frac{406}{249}$. **1119.** $\frac{729}{1727}$.

1120. $\frac{999}{2222}$. **1121.** $\frac{1254}{2255}$. **1122.** $\frac{18772}{7779}$.

1123. $\frac{56252}{10055}$. **1124.** $\frac{5a+2}{2a+1}$. **1125.** $\frac{5a^2+4a+1}{5a+2}$.

1126. $\frac{a^5b^6+a^5b+a^2b^5+a^5b^4+a^3+a^2b^3+a^2+b^3}{a^2b^6+a^2b+b^3+b^4+1}$.

1127. $\frac{a^7+a^5+a^4+a^2+1}{a^6+a^3+a}$. **1128.** $\frac{a^{10}+a^7+a^5+a^3+1}{a^6+a^3+a}$.

1129. $\dfrac{36a^2b^2+16ab+1}{18ab^2+3b}$.

1130. $\dfrac{a^{10}-a^8b^2+4a^6-2a^6b^4+2a^4b^6-2a^4b^2+3a^2+a^2b^8-4a^2b^4-b^2+2b^6-b^{10}}{a^8-2a^6b^2+3a^4+2a^2b^6-4a^2b^2-b^8+b^4+1}$.

1131. $\dfrac{a^{10}-a^8b^2+3a^6-2a^6b^4+2a^4b^6-3a^4b^2+a^4+a^2b^8+a^2b^4+2a^2-b^{10}-b^6-b^4}{a^8-2a^4b^4+3a^4+b^8+b^4+1}$.

1132. $\dfrac{a^{13}-a^3b^{12}+2a^{11}+2a^5b^6+a^{10}+a^4b^6-a^7b^3-ab^9+a^6+b^6+a^7-ab^6+2a^3}{(a^6+b^6)(a^3+b^3)a^3+(a^2+a)(a^6+b^6)+(a^3+b^3)a+1}$.

ARTÍCULO II.

Hallar la generatriz y reducidas de una fraccion contínua.

§ 1.—HALLAR LA FRACCION GENERATRIZ DE CADA UNA DE LAS CONTINUAS SIGUIENTES:

1133. $2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2}}}}}$.

1134. $3+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{9}}}}}}$.

1135. $\cfrac{1}{2702+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{5}}}}}}$.

1136. $\cfrac{1}{548+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{5+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3}}}}}}}$.

1137.

$$23+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{10+\frac{1}{3}}}}}}}.$$

1138.

$$3+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{11+\cfrac{1}{10+\cfrac{1}{9+\cfrac{1}{8+\frac{1}{7}}}}}}}}.$$

1139.

$$\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{132+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{2}}}}}}}}}$$

1140. $\cfrac{1}{348+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{3+\cfrac{1}{1+\frac{1}{2}}}}}}}}}$.

1141. $32+\cfrac{1}{33+\cfrac{1}{51+\cfrac{1}{30+\frac{1}{29}}}}$

1142. $7+\cfrac{1}{11+\cfrac{1}{32+\cfrac{1}{67+\cfrac{1}{321+\frac{1}{1512}}}}}$.

1143. $a^5+\cfrac{1}{a^4+\cfrac{1}{a^3+\cfrac{1}{a^2+\frac{1}{a}}}}$.

1144. $a^3+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\frac{1}{a^5}}}}$.

1145. $a^2+\cfrac{1}{3+\cfrac{1}{a+\cfrac{1}{2+\cfrac{1}{a^2+\cfrac{1}{3+\frac{1}{a^3}}}}}}$

1146. $a-1+\cfrac{1}{a+1+\cfrac{1}{a+1+\cfrac{1}{a+1+\cfrac{1}{a-1}}}}$

1147. $a+1+\cfrac{1}{a-1+\cfrac{1}{a+1+\cfrac{1}{a-1+\cfrac{1}{a+1+\frac{1}{a-1}}}}}$

1148. $a^2-1+\cfrac{1}{a^2+\cfrac{1}{a^2+1+\cfrac{1}{a^4+\frac{1}{a^4+b^4}}}}$.

1149. $$a^3-1+\cfrac{1}{a^2-1+\cfrac{1}{a^2+1+\cfrac{1}{a^3+1+\cfrac{1}{a^6+1}}}}.$$

1150. $$a+b+\cfrac{1}{a-b+\cfrac{1}{a^2+b^2+\cfrac{1}{a^2-b^2+\cfrac{1}{a^3+b^3+\cfrac{1}{a^3-b^3}}}}}.$$

1151. $$a^5+b^5+\cfrac{1}{a^3-1+\cfrac{1}{a^1+\cfrac{1}{a^3+\cfrac{1}{a^1-1+\cfrac{1}{a^1+1}}}}}.$$

1152. $$a^2-4+\cfrac{1}{a^2+4+\cfrac{1}{a+1+\cfrac{1}{a-1+\cfrac{1}{a^3-9+\cfrac{1}{a^3+9}}}}}.$$

1153. $$3a+2+\cfrac{1}{3a-2+\cfrac{1}{3+2a+\cfrac{1}{3-2a+\cfrac{1}{a+3+\cfrac{1}{a-3+\cfrac{1}{a^2+9+\cfrac{1}{a^2-9}}}}}}}.$$

§ II.—HALLAR DIFERENTES REDUCIDAS DE UNA FRACCION CONTINUA.

1154. Hallar la cuarta reducida de la fraccion contínua equivalente á la ordinaria $\frac{30173449}{2498714}$.

1155. La quinta de $\frac{652400}{5951751}$.

1156. La sexta de $\frac{2220525}{541944}$.

1157. La séptima de $\frac{1768957}{230527}$.

1158. La octava de $\frac{736}{269}$.

1159. La novena de $\frac{5877}{1417}$.

1160. La tercera de $\frac{a^{22}+a^9+a^{11}+a^{13}+1}{a^{15}+a^4+a^6}$.

1161. La cuarta de

$$a^2+\cfrac{1}{b^2+\cfrac{1}{a^2+\cfrac{1}{b^2}}}.$$

1162. La quinta de $\frac{a^{27}+a^{14}+a^{16}+a^{18}+a^5+a^{20}+a^7+a^{22}+2a^9+a^{11}+a^{13}+1}{a^{20}+a^9+a^{11}+a^{13}+a^2+a^{15}+a^4+a^6}$.

1163. La quinta de $\frac{29a^6+24a^3+5}{29a^3+12}$.

1164. La séptima de $\frac{290a^6+527a^3+86}{290a^3+207}$.

1165. La octava de $\frac{290a^7+527a^4+86a+87a^6+101a^3+27}{290a^4+207a+87a^3+65}$.

ARTICULO III.

Desarrollar en fraccion contínua cualquiera de las dos raíces de una ecuacion de segundo grado.

1166. Desarrollar en fraccion contínua la raíz positiva de la ecuacion $3x^2+2x-7=0$.

1167. La positiva de $25x^2-37x-7=0$, y hallada que sea la fraccion contínua buscar la raíz.

1168. ¿Cuál es la décima tercia reducida de la fraccion contínua del número anterior?

1169. La positiva de $101x^2-308x-134=0$ y de la fraccion contínua deducir la raíz.

1170. ¿Cuál es la séptima reducida de la fraccion contínua resultante?

1171. La negativa de la misma ecuacion $101x^2-308x-134=0$.

1172. Las dos de $5x^2-11x-2=0$.

1173. Hallar: 1.° la ecuacion de segundo grado cuya raíz positiva desarrollada en fraccion continua sea

$$x=1+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{x}}}};$$

2.° El desarrollo de su raíz negativa en fraccion contínua.

1174. La fraccion

$$x=5+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{x}}}}}$$

es el desarrollo de la raíz positiva de cierta ecuacion de segundo grado. Se pregunta: 1.° cuál es dicha ecuacion; 2.° qué desarrollo dará la raiz negativa.

1175. 1.° ¿Cuál es la ecuacion de segundo grado cuya raiz positiva tiene por desarrollo

$$x=1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{3+\cfrac{1}{2+\cfrac{1}{x}}}}}}}$$

2.° Hallada la ecuacion, desarrollar en fraccion contínua su raiz negativa.

ARTICULO IV.

Aproximaciones por medio de las reducidas.

1176. Llevar el desarrollo en fraccion contínua de la raiz positiva de la ecuacion

$$37x^2+8x-5=0$$

hasta un cociente incompleto tal que el error que se cometa al tomarla reducida correspondiente no llegue á valer media diezmilésima.

1177. Hacer lo mismo con el de $\sqrt{70}$ para que el error sea menor que $\frac{1}{5}$ de diezmilésima.

1178. Llevar el desarrollo de $\sqrt{123}$ en fraccion continua hasta el cociente incompleto necesario para que la reducida correspondiente discrepe de la raiz propuesta en menos de $\frac{1}{5}$ de cienmilésima.

1179. Calcular por medio de las reducidas con un error menor que 0,00000001 el valor de la fraccion contínua periódica

$$x=1+\cfrac{1}{2+\cfrac{1}{3+\cfrac{1}{x}}}$$

1180. Hacer lo mismo con el de la fraccion contínua periódica

$$x=\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{x}}}}}}$$

con un error menor que media diezmilloné-sima.

1181. Calcular del mismo modo el valor de la

$$x=1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{2+\cfrac{1}{x}}}}}}$$

para que el error sea menor que $\frac{1}{5}$ de cienmillonésima.

1182. Hallar la reducida que se diferencia en menos de $\frac{1}{7}$ de diezmillonésima del verdadero valor de la fraccion contínua periódica

$$x=1+\cfrac{1}{2+\cfrac{1}{5+\cfrac{1}{x}}}.$$

1183. Dada la fraccion contínua periódica

$$x=3+\cfrac{1}{4+\cfrac{1}{5+\cfrac{1}{2+\cfrac{1}{x}}}}$$

se pide encontrar la reducida cuyo valor se aproxime en más de $\frac{1}{9}$ de cienmillonésima al de aquella.

1184. ¿Cuál es la reducida que se diferencia en menos de $\frac{1}{3}$ de diezmilésima de la fraccion contínua periódica

$$x=9+\cfrac{1}{8+\cfrac{1}{7+\cfrac{1}{x}}}\ ?$$

1185. Hallar la reducida que da el valor de la fraccion

$$x=9+\cfrac{1}{8+\cfrac{1}{7+\cfrac{1}{x}}}$$

con un error menor que $\frac{1}{7}$ de milmillonésima.

1186. Desarrollar la cantidad inconmensurable 0,234234234..... en fraccion contínua llevando la operacion hasta que no haya certeza en los cocientes incompletos.

1187. Hacer lo mismo con la cantidad 0,356356356.....

1188. Igual operacion con 0,989989989.....

1189. La misma con 1,35353535.....

CAPITULO XII.

EJERCICIOS SOBRE COORDINACIONES, PERMUTACIONES Y COMBINACIONES.

ARTICULO UNICO.

1190. ¿Cuántas coordinaciones pueden formarse con las 27 letras de nuestro alfabeto tomándolas de 8 en 8?

1191. ¿Cuántas tomándolas de 9 en 9?

1192. ¿Cuántas tomadas de 10 en 10?

1193. Hallar el número de coordinaciones de 27 objetos tomados de 7 en 7.

1194 El que resulte tomándolos de 6 en 6.

1195. ¿Cuántas si se toman de 5 en 5?

1196. ¿Cuántas tomados de 4 en 4?

1197. ¿Cuántas podrán formarse tomándolos de 3 en 3?

1198. ¿Cuántas si se forman de 2 en 2?

1199 ¿Cuáles son las coordinaciones de á 2 que se pueden formar con las cinco vocales *a, e, i, o, u*?

1200. ¿Cuáles serán las que se pueden hacer con las mismas vocales tomadas de 3 en 3?

1201. ¿Cuáles son las de á 3 que pueden formarse con las ocho letras *a, b, c, d, e, f, g, h*?

1202. ¿Cuántas permutaciones pueden formarse con los nueve números dígitos.

1203. ¿Con los ocho primeros dígitos?

1204. ¿Con los siete primeros?

1205. ¿Cuántas con los seis?

1206. ¿Con los cinco?

1207. ¿Cuántas con los cuatro?

1208. ¿Cuántas con los números 1, 2 y 3?

1209. ¿Con los dos primeros dígitos?

1210. ¿Cuántas pueden formarse con las 27 letras de nuestro alfabeto?

1211. Determinar el número de combinaciones de á cinco que pueden hacerse con los noventa primeros números.

1212. El de las de á cuatro.

1213. El de las de á tres.

1214. ¿Cuántas pueden formarse de á dos con los mismos noventa números?

CAPITULO XIII.

LOGARITMOS.

ARTICULO I.

Hallar el logaritmo de un número dado.

§. I—EN EL SISTEMA DE BRIGGS.

1215. Log. 76543. **1216**. Log. 56789.

1217. Log. 89567. **1218**. Log. 345678.

1219. Log. 789123. **1220**. Log. 543214.

1221. Log. 98765. **1222**. Log. 973182.

1223. Log. 234528. **1224**. Log. 3994002.

1225. Log. 8626058. **1226**. Log. 3854596.

1227. Log. 9876543. **1228**. Log. 7891234.

1229. Log. 1234567. **1230**. Log. 26275914.

1231. Log. 77634522. **1232**. Log. 27896543.

1233. Log. 78965432. **1234**. Log. 73856928.

1235. Log. 57123456.

1236. Log. 1129864302.

1237. Log. 2259728604.

1238. Log. 342,567. **1239**. Log. 978,6543.

1240. Log. 26,84327. **1241**. Log. 0,000789.

1242. Log. 0,00943512.

1243. Log. 23,853956512.

1244. Log. 3,896563923.

1245. Log. 0,00897756432.

1246. Log. $\frac{255316}{856317}$. **1247**. Log. $\frac{8523}{17957}$.

1248. Log. $\frac{16554}{357931}$. **1249**. Log. $\frac{25541}{354815}$.

1250. Log. $\frac{45545}{512211}$. **1251**. Log. $\frac{57856}{123515}$.

1252. Log. $\frac{8765}{94328}$. **1253**. Log. $\frac{116}{123457}$.

1254. Log. $\frac{856}{977515}$. **1255**. Log. $\frac{8525}{1857949}$.

1256. Log. $\frac{25}{999885}$.

§. II.—DADO UN NÚMERO HALLAR CON 20 DECIMALES SU LOGARITMO EN EL SISTEMA NEPERIANO.

1257. Log. 137. **1258**. Log. 159.

1259. Log. 263. **1260**. Log. 1017.

1261. Log. 1129. **1262**. Log. 55581.

1263. Log. 11781. **1264**. Log. 9657.

1265. Log. 47083. **1266**. Log. 1285089

1267. Log. $\frac{99}{125}$. **1268**. Log. $\frac{121}{833}$.

1269. Log. $\frac{525}{851}$. **1270**. Log. $\frac{515}{1135}$.

1271. Log. $\frac{1121}{1197}$. **1272**. Log. 1010592.

1273. Log. 1011757. **1274**. Log. 10117623.

1275. Log. 10117326. **1276**. Log. 147150.

1277. Log. 149113. **1278**. Log. 200153.

§. III.—HALLAR CON SIETE DECIMALES EL LOGARITMO QUE EN EL SISTEMA CUYA BASE ES 7 CORRESPONDA Á UN NÚMERO DADO.

1279. Log. 2. **1280**. Log. 3.

1281. Log. 5. **1282**. Log. 9.

1283. Log. 0,11. **1284**. Log. 0,013.

1285. Log. 0,0017. **1286**. Log. $\frac{7}{3}$.

1287. Log. $\frac{19}{25}$. **1288**. Log. $\frac{97}{115}$.

ARTICULO II.

Hallar el número correspondiente á un logaritmo dado.

§ I. EN EL SISTEMA DE BRIGGS.

1289. 3,8756329. **1290.** 3,1954738.

1291. 2,1982375. **1292.** 2,9453812.

1293. 7,1526378. **1294.** 9,4569873.

1295. 11,2756491. **1296.** 13,5142337.

1297. 17,0030027. **1298.** 5,1001001.

1299. $\bar{1}$,2233554. **1300.** $\bar{2}$,3745927.

1301. $\bar{3}$,0057049. **1302.** $\bar{2}$,0000057.

1303. $\bar{4}$,5300035. **1304.** $\bar{4}$,0035007.

1305. $\bar{1}$,3020104. **1306.** $\bar{1}$,1203205.

1307. $\bar{3}$,0013307. **1308.** $\bar{5}$,5348619.

1309. —0,9784433. **1310.** —0,1122334.

1311. —1,9988556. **1312.** —1,3592783.

1313. —2,7118857. **1314.** —3,9257691.

1315. —3,4165161. **1316.** —3,1971932.

1317. —7,5633927. **1318.** —5,0107096.

§ II. EN EL NEPERIANO CON 20 CIFRAS.

1319. 4,20469 26193 90966 05967.

1320. 4,55387 68916 00540 83461.

1321. 4,74493 21283 63250 06541.

1322. 3,80666 24897 70319 75739.

1323. 1,94591 01490 55313 30511.

1324. 1,00438 98765 76931 35001.

1325. 2,00443 73295 85003 95007.

1326. 3,00469 54702 00075 13509.

1327. 4,00487 19543 85310 90759.

1328. 5,00499 99999 88811 19683.

1329. 5,00000 57689 35467 83529.

1330. 3,00005 59991 88855 77733.

1331. 5,00017 87953 78951 35985.

1332. 5,46272 61172 07184 15204.

1333. 6,35210 87543 91005 00721.

§ III. EN EL SISTEMA CUYA BASE ES 7.

1334. 3,2359867. **1335.** 2,3976549.

1336. 5,0890073. **1337.** 9,1270053.

1338. 7,0095407. **1339.** 1,0203056.

1340. 0,0023769. **1341.** 0,0003945.

1342. —0,4379112. **1343.** —1,0307091.

1344. —2,9070503. **1345.** —3,9780123.

1346. —4,0715093. **1347.** —5,0001759.

1348. —6,1000009.

ARTICULO III.

Formular el logaritmo de cada una de las expresiones siguientes.

1349. $\text{Log. } a^{3m}\, b^{4m}\, c^{8mn}$.

1350. $\text{Log. } \left\{7a^{m}\, b^{mn}\, c^{nq}\right\}^{p}$.

1351. $\text{Log. } \sqrt[mn]{a^{p}\, b^{2pq}\, c^{5qp}}$.

1352. $\text{Log. } a^{\frac{2}{n}}\, b^{\frac{2}{m}\frac{5}{n}}\, c^{\frac{3}{m}\frac{4}{n}}$.

1353. $\text{Log. } \left\{a^{\frac{m}{n}}\, b^{\frac{n}{p}}\, c^{\frac{p}{q}\frac{q}{mn}}\right\}$.

1354. $\text{Log. } \dfrac{\sqrt[n]{\left\{a^{5}\, b^{2}\, c^{\frac{m}{7}}\right\}}}{\left\{\sqrt[q]{a^{7}\, b^{2}\, c^{5}}\right\}^{r}}$.

1355. $\text{Log. } \dfrac{\sqrt[3]{a^{m}\, b^{n}}}{a^{m}\, b^{n}\sqrt[p]{a^{r}\, b^{s}}}$.

1356. $\text{Log.}\ \dfrac{\sqrt[3]{a^2-b^2}}{a^2b^2\sqrt[5]{a+b}\times\sqrt[7]{a-b}}$.

1357. $\text{Log.}\ \dfrac{ab\sqrt{a+b}\times\sqrt[3]{a-b}}{\left\{a^2-b^2\right\}\sqrt[5]{a^2-b^2}}$.

1358. $\text{Log.}\ \dfrac{\left\{a-b\right\}^7\sqrt[7]{\left\{a^2-b^2\right\}^5}}{\left\{a^3-b^3\right\}^3\times\sqrt[5]{a^3-b^3}\times\sqrt[3]{a^2-b^2}}$.

ARTICULO IV.

Calcular el logaritmo correspondiente en el sistema de Briggs á cada una de las expresiones siguientes.

1359. 342^7. **1360.** 1024^5. **1361.** 3021^{27}.

1362. 517^{57}. **1363.** 12345^{729}.

1364. $\sqrt[7]{835973652}$. **1365.** $\sqrt[7]{854692}$.

1366. $\sqrt[15]{93658}$ **1367.** $\sqrt[23]{9753124680}$.

1368. $\dfrac{\frac{15}{124}\sqrt[7]{513}}{\sqrt[5]{825}}$. **1369.** $\dfrac{841\times\frac{23}{840}\times\sqrt[7]{527}}{\left\{\sqrt[5]{23}\right\}^7\times\sqrt[4]{121}}$.

1370. $\dfrac{(325\times547)^{13}\times\sqrt{857}}{(813\times1273)^5}$.

1371. $$\frac{\left\{123^4\times 312^5\right\} : \left\{825\times\frac{13}{283}\right\}^5}{\sqrt[7]{835}}.$$

1372. $$\frac{13\sqrt[3]{728}\times 512\left\{637\sqrt{5}\right\}^7}{\frac{513}{1024}\sqrt[7]{825}}.$$

1373. $$\frac{\frac{128}{513}\sqrt[3]{824}\times 0{,}5\sqrt[7]{512}}{\frac{113}{257}\sqrt[6]{\frac{83}{525}}}.$$

1374. $$\frac{\left\{128\times\frac{519}{1025}\sqrt[7]{113}\right\}^5\sqrt[9]{13}}{\frac{\sqrt{7}}{512^{12}\times\frac{125^7}{213^5}\sqrt[11]{835}}}.$$

1375. $$\sqrt[13]{\frac{\left\{\frac{7}{0{,}537}\sqrt{824}\right\}^{10}\times\sqrt[5]{\frac{95^7\times 513^5}{749\times\left\{\frac{23}{49}\right\}^3}}}{\left\{\frac{123^{10}}{1025^9}\sqrt[3]{25}\right\}^9\sqrt{\frac{0{,}5}{325^5}}}}.$$

1376. $$\frac{\left\{\sqrt[11]{73^7\times\frac{15^9}{113^7}}\right\}^{10}\times\left\{528\sqrt[8]{113^5}\times\sqrt[9]{512^7}\right\}^2}{\frac{113}{528}\sqrt{125}\times\left\{\frac{128}{17}\sqrt{126}\right\}^{20}}.$$

1377. $$\frac{\left\{\sqrt[4]{132\times\left\{\frac{12}{25}\right\}^{11}}\right\}^7\times\left\{\sqrt[3]{\left\{\frac{123}{148}\right\}^8\times\left\{\frac{15}{93}\right\}^{13}}\right\}^9}{\left\{\frac{83}{27}\right\}^5\sqrt[5]{1026}}.$$

CAPITULO XIV.

RAZONES Y PROPORCIONES.

ARTICULO I.

Razones.

§ I.—HALLAR LA RAZON POR DIFERENCIA ENTRE DOS CANTIDADES DADAS.

1378. a^5-b; a^2-b. **1379.** a^5-8; $8-a^5$.

1380. a^7+7; a^7-7. **1381.** a^2-1; $1-a^2$.

1382. a^2-1; a^2+1.

1383. a^5-b+7; a^4+b+2.

1384. $a^5-3a^2b+b^5$; $3a^2b-b^5-a^5$.

1385. $a^2+2ab+b^2$; $a^2-2ab+b^2$.

1386. $a^2+2ab+b^2$; $a^2-2ab-b^2$.

1387. $\{a+1\}^5$; $\{a+1\}^2$.

§ II.—HALLAR LA RAZON GEOMÉTRICA ENTRE DOS CANTIDADES.

1388. $\{a-b\}^4$; $\{a+b\}^5$. **1389.** $\sqrt{a+b}$; $\sqrt[4]{a+b}$.

1390. $\sqrt[5]{a^2-b^2}$; $\sqrt[9]{a+b}$.

1391. $\sqrt[4]{a^3-1}$; $\sqrt{a^2+a+1}$.

1392. a^2-1; $a+1$. **1393.** a^3-1; a^2+a+1.

1394. a^4-b^4; a^3-b^3. **1395.** a^5-3125; a^2-25.

1396. $a^5+a^3-2a^2-2$; a^3-2.

1397. $a^7+7a^4+3a^3+21$; a^4+3.

1398. $a^4+a^3b-ab^3-b^4$; a^2-b^2.

1399. $\sqrt{\{a^7+a^4+2a^3+2\}}$; $\sqrt{\{a^4+2\}}$.

1400. $\sqrt[4]{\{a^9-a^6-a^3+1\}}$; $\sqrt[4]{\{a^3+1\}}$.

1401. $\sqrt[6]{\{a^{13}+2a^{11}b^2-3a^{10}b^3+a^9b^4-6a^8b^5+3a^7b^6-3a^6b^7+6a^5b^8-a^4b^9+3a^3b^{10}-2a^2b^{11}-b^{13}\}}$;

$\sqrt{\{a^3-b^3\}}$.

ARTICULO II.

Proporciones.

§ I.—FORMULAR EL VALOR DE x EN CADA UNA DE LAS SIGUIENTES PROPORCIONES POR DIFERÉNCIA.

1402. $\{a+1\} \cdot \{a-1\} : a \cdot x$.

1403. $\{a^3-1\} \cdot \{a^2+1\} : \{a-1\} \cdot x$.

1404. $\{a^3+1\} \cdot \{a^2+1\} : \{a^2-1\} \cdot x$.

1405. $\{a^2+b^2\} \cdot \{a^2-b^2\} : \{b^2-a^2\} \cdot x$.

1406. $\{a^3+8\} \cdot \{a^4+3\} : x \cdot \{5-a^2\} \cdot$

1407. $\{a^3+11\} \cdot \{a^3-11\} : x \cdot \{11-a^3\}$.

1408. $\{5a^3-3b^2\} \cdot \{5a^3+3b^2\} : x \cdot \{3b^2-5a^3\}$.

1409. $\{3a^2+1\} \cdot \{3a^2-1\} : x \cdot \{1-3a^2\}$.

1410. $\div a^2b^3 \cdot x \cdot a^3b^2$.

1411. $\div\{a^2+1\} \cdot x \cdot \{a^2-1\}$.

1412. $\div\{a^3-8\} \cdot x \cdot \{8-a^3\}$.

1413. $\div\{a^2-b\}^3 \cdot x \cdot \{a^2+b\}^2$.

§ II.—FORMULAR EL VALOR DE x EN LAS PROPORCIONES GEOMÉTRICAS QUE SIGUEN.

1414. $a^3b^4 : a^4b^3 :: a^7 : x$.

1415. $a^3b^5 : a^4b^4 :: a^3b^3 : x$.

1416. $\{a+b\} : \{a-b\} :: \{a^3-b^3\} : x$.

1417. $\{2a^3b^2-3a^2b^3\} : \{5ab^4-4ab^5\} :: \{3a^2-2b^2\} : x$.

1418. $\{a^2-b\} : \sqrt{a+b} :: \{a-b^2\} : x$.

1419. $\sqrt{a-b} : \sqrt[3]{a+b} :: \sqrt[5]{a^2+b^2} : x$.

1420. $\sqrt{5a^3+3b^2} : \sqrt[5]{2a^2-3b^3} :: \sqrt[4]{a^2+b^2} : x$.

1421. $\{3a^7+5b^3\} : \{5a^2-3b^3\} :: x : \{4a^2+5b^2\}$.

1422. $\{a^7+3b^7\} : \{2a^5-3b^5\} :: x : \{a^4+b^4\}$.

1423. $\{5a^3+3b^2\} : \{4a^3-2b^4\} :: x : \{20a^6-12a^3b-10ab^4+6b^5\}$.

1424. $\{a^3+7b\} : \{9c+3b^2\} :: x : \{27ac+9ab^2+18cd+6b^2d\}$.

1425. $\{2a^3-7b^3\} : \{5c^2-4d^3\} :: x : \{5a^2c^2-4a^2d^3-5c^2+4d^3\}$.

1426. $\div\!\!\div \{4a^2+12ab+9b^2\} : x : \{16a^4+144a^2b^2+81b^4+96a^3b+72a^2b^2+216ab^3\}$.

1427. $\div\!\!\div \{8a^9+36a^6b^2+54a^3b^4+27b^6\} : x : \{32a^{15}+240a^{12}b^2+720a^9b^4+1080a^6b^6+810a^3b^8+243b^{10}\}$.

1428. $\div\!\!\div \{8a^3-3b^9\} : x : \{9a^3-5b^3\}$.

1429. $\div\!\!\div \sqrt{a-b} : x : \sqrt[3]{a+b}$.

1430. $\div\!\!\div \sqrt[3]{a^2-b^2} : x : \sqrt[5]{a^2-b^2}$.

1431. $\div\!\!\div \sqrt[3]{a^2-b^2} : x : \sqrt[5]{a^2+b^2}$.

CAPITULO XV.

PROGRESIONES.

ARTICULO I.

Por diferencia.

§ 1.—CONOCIENDO EL PRIMER TÉRMINO p Y LA RAZON r HALLAR EL TÉRMINO u QUE OCUPE EL LUGAR n.

1432. $p=3a+8b$; $r=7a-5b$; $n=5$

1433. $p=12a-11b$; $r=3a-9b$; $n=7$.

1434. $p=3a-2b$; $r=\frac{2}{5}a+\frac{5}{4}b$; $n=5$.

1435. $p=4a-3b$; $r=\frac{3}{5}a-\frac{2}{7}b$; $n=6$.

1436. $p=\frac{5}{7}a+\frac{2}{5}b$; $r=5a+7b$; $n=7$.

1437. $p=\frac{7}{9}a+\frac{3}{5}b$; $r=7a-2b$; $n=7$.

1438. $p=\frac{4}{5}a-\frac{5}{7}b$; $r=5a-7b$; $n=8$.

1439. $p=0,5a+0,05b$; $r=5a+4b$; $n=8$.

1440. $p=0,2a+0,7b$; $r=0,3a-0,5b$; $n=9$.

1441. $p=8a-9b$; $r=0,9a+0,07b$; $n=6$.

1442. $p=3a-5b$; $r=-9b$; $n=7$.

1443. $p=8a^2$; $r=5a^2-9b^3$; $n=5$.

§ II.—DADA LA RAZON r, UN TÉRMINO u, Y SABIENDO EL LUGAR n QUE ESTE OCUPA EN LA PROGRESION, CALCULAR EL PRIMERO p.

1444. $r=a+1$; $u=a^2+6a+5$; $n=7$.

1445. $r=a+1$; $u=5a+3$; $n=5$.

1446. $r=a^2+b$; $u=14a^2+6b$; $n=12$.

1447. $r=a^2+1$; $u=17a^2+15$; $n=17$.

1448. $r=a^2+b^2$; $u=21a^2+19b^2$; $n=21$.

1449. $r=b^5-a^5$; $u=17\{b^5-a^5\}$; $n=19$

1450. $r=2a^2+5b$; $u=51a^2+116b$; $n=25$.

1451. $r=11b^3+10c^2$; $u=5a^2b+176b^3+160c^2+4c^3$; $n=17$.

1452. $r=\frac{2}{5}a^3b^4-\frac{3}{2}c^3d^2$; $u=7\frac{4}{5}a^3b^4-27\frac{2}{3}c^3d^2$; $n=19$.

1453. $r=0,5a^7b^5+8c^4d^3$; $u=15a^7b^5+127,5c^4d^3$; $n=17$.

§ III.—HALLAR LA RAZON r NECESARIA PARA INTERPOLAR n MEDIOS ARITMÉTICOS ENTRE LAS CANTIDADES p Y u.

1454. $p=a^3+b^3$; $u=13a^3-11b^3$; $n=11$.

1455. $p=a^2-2b^5$; $u=13a^3+a^2-2b^5-39b^2$; $n=12$.

1456. $p=0,5a^3b^2-2c^5d^4$; $u=8a^3b^2+133c^5d^4$; $n=14$.

1457. $p=18a^9b^5+4c^7$; $u=4c^7+18d^7$; $n=17$.

1458. $p=20a^6d^5+21b^4c^6$; $u=40a^6d^5+b^4c^6$; $n=19$.

1459. $p=21a^9-20b^7$; $u=b^7$; $n=20$.

1460. $p=22\{a^5b^4c^5-d^7f^6\}$; $u=176$; $n=21$.

1461. $p=a^3b^2-0,5b^5c^4+2c^5$; $u=a^2\{69+ab^2\}+c^3\{115-0,5b^5c+2c^2\}$; $n=22$.

1462. $p=19a^3+14b^2$; $u=19a^3+14b^2+75a^2-125b^4$; $n=24$.

1463. $p=5a^2-3b^2c$; $u=173a^2-3b^2c-216c^3d^4$; $n=23$.

§ IV.—DÁNDOSE EL PRIMER TÉRMINO p Y LA RAZON r CALCULAR LA SUMA S DE n TÉRMINOS.

1464. $p=1$; $r=a^3$; $n=21$.

1465. $p=a^7$; $r=2a^6$; $n=11$.

1466. $p=a+1$; $r=a-1$; $n=5$.

1467. $p=a^2-b^2$; $r=a^2+1$; $n=15$.

1468. $p=70a^2-7b^5$; $r=7b^5-70a^2$; $n=8$.

1469. $p=15a^7b^4-b^5c^2$; $r=b^5c^2-a^7b^4$; $n=31$.

1470. $p=3a^2$; $r=a+5b^2$; $n=20$.

1471. $p=3a^5-5b^4$; $r=b^4+5c^5+7d^4$; $n=13$.

§ V.—DADAS TRES DE LAS CINCO CANTIDADES p, r, u, n, S, DETERMINAR LAS OTRAS DOS.

1472. $u=a^5-b^2$; $n=15$; $S=a^5-b^4$.

1473. $u=a^5-b^5$; $n=20$; $S=b^5-a^5$.

1474. $u=5a^3b^2+7c^3$; $n=19$; $S=a^7+b^7$.

1475. $u=7a^4b^{10}+5c^{10}d^4$; $n=7$; $S=0,5$.

1476. $u=2,5$; $n=11$; $S=5a^5-8$.

1477. $r=0,5a^7-3b^2$; $n=23$; $S=a^4-b^4$.

1478. $r=a^5-5ab+b^5$; $n=17$; $S=a^4b^2$.

1479. $r=a^3+8ab+5$; $n=25$; $S=a^4+3a^2b+b^5$.

1480. $r=3a^4-0,5$; $n=22$; $S=43,5$.

1481. $r=7a^5+3a^4$; $n=13$; $S=a^2+13$.

1482. $r=8$; $u=a^3+2$; $S=a^3+5a^2+4a+1$.

1483. $r=8a+3$; $u=8a-3$; $S=3-8a$.

1484. $r=a^3-5b$; $u=a^3+7b$; $S=25a^5-37b$.

1485. $r=5+3a^2$; $u=25-9a^4$; $S=1-a^4$.

1486. $r=a^2+b^2$; $u=43a^2-27b^5$; $n=13$.

1487. $r=a^{15}b-cd^{15}$; $u=83a^{15}b+70cd^{15}$; $n=21$.

1488. $r=7a^5+1$; $u=a^5-1$; $n=19$.

1489. $r=5a^7+3b^4$; $u=35a^7+23b^4$; $n=15$.

1490. $p=a^3+2$; $n=29$; $S=47a^3-54$.

1491. $p=13a^3-b^4$; $n=19$; $S=93a^3+3b^4$.

1492. $p=11a^6+2b^5$; $n=13$; $S=10a^6+b^5$.

1493. $p=7a^4-0{,}5$; $n=14$; $S=125$.

1494. $p=13$; $u=47a^5+5$; $S=a^4+3a^3b+ab^2+b^4$.

1495. $p=4a^{11}-8$; $u=47$; $S=a^2+95$.

1496. $p=a^7+b$; $u=a^5+b^2$; $S=a^7+a^5-b^2$.

1497. $p=23$; $u=22$; $S=21a^3+5$.

1498. $p=a^3-1$; $u=4a^3-7$; $n=13$.

1499. $p=a^2+b^2$; $u=3a^2-5b^2$; $n=11$.

1500. $p=7a^5+b^7$; $u=11b^7$; $n=13$.

1501. $p=9a^3+b^3$; $u=4b^2+1$; $n=27$.

1502. $p=5$; $r=14$; $S=825$.

1503. $p=7$; $r=4$; $S=900$.

1504. $p=8$; $r=13$; $S=2375$.

1505. $p=13$; $r=39$; $S=4290$.

1506. $p = a^2 + b^2$; $r = 16 + 2a^2 + 2b^2$; $S = \frac{-247}{4^2 8 + 16a^2 + 16b^2}$.

1507. $p = a + 3b$; $r = 3a + b$; $S = 176a + 88b$.

1508. $p = 15a + 7b$; $r = 8b$; $S = 165a + 517b$.

1509. $p = 11$; $r = 10$; $n = 17$.

1510. $p = 13$; $r = -7$; $n = 21$.

1511. $p = a^3 - b^4$; $r = a^4 - b^5$; $n = 23$.

1512. $p = a^4 + 5$; $r = 8 - 7a$; $n = 17$.

1513. $p = 23$; $r = 7$; $u = 226$.

1514. $p = -83$; $r = 7$; $u = 29$.

1515. $p = a^3 - b^5$; $r = a^2 - b^2$; $u = a^2\{a + 20\} - b^2\{b + 20\}$.

1516. $p = a^3 + b^2$; $r = b^2 - a$; $u = a^3 - 10a + 11b^2$.

ARTICULO II.

Por cociente,

§ 1.—CONOCIENDO EL PRIMER TÉRMINO p, LA RAZON q Y EL LUGAR n QUE HA DE OCUPAR UN TÉRMINO u HALLAR ESTE.

1517. $p = 3a^2 + 5b$; $q = a^2 + b^2$; $n = 7$.

1518. $p = a^3 - b$; $q = a - b^3$; $n = 8$.

1519. $p = a + b$; $q = a^2 + b^2$; $n = 9$.

1520. $p = a^2 - b^2$; $q = a^2 + b^2$; $n = 10$.

1521. $p=\{a^2+b^2\}^{11}$; $q=a^2-b^2$; $n=12$.

§ II.—DADA LA RAZON q, UN TÉRMINO u, Y SABIENDO EL LUGAR n QUE ÉSTE OCUPA EN LA PROGRESION, CALCULAR EL PRIMERO p.

1522. $q=a+b$; $u=\{a^2+ab+b^2\}\{a^2-b^2\}\{a+b\}^5$; $n=7$.

1523. $q=a-b$; $u=\{a^2-b^2\}\{a-b\}^9$; $n=11$.

1524. $q=a^4-b^4$; $u=\{a^2+b^2\}^{11}\{a^2-b^2\}^{10}$; $n=11$.

1525. $q=a-b^5$; $u=\{a^8-b\}\{a-b^3\}^{12}$; $n=13$.

1526. $q=a^5+b^5$; $u=a^5+b^5$; $n=15$.

1527. $q=a-1$; $u=a^{11}-1$; $n=13$.

1528. $q=a^7-3$; $u=9$; $n=19$.

1529. $q=a^3-8$; $u=27$; $n=17$.

§ III.—HALLAR LA RAZON q NECESARIA PARA INTERPOLAR n MEDIOS GEOMÉTRICOS ENTRE LAS CANTIDADES p Y u.

1530. $p=\{a^3-b^5\}^7$; $u=\{a-b\}^7$; $n=6$.

1531. $p=\{a+b\}^8$; $u=\{a^2-b^2\}^{16}$; $n=7$.

1532. $p=\{a^5-b^5\}^7$; $u=\{a+b\}^5$; $n=4$.

1533. $p=729$; $u=\{81a^5-b^5\}^5$; $n=5$.

1534. $p=a-b$; $u=\{a^2-b^2\}^9$; $n=7$.

1535. $p=a^5+b^5$; $u=a^5-b^5$; $n=11$.

§ IV.—DANDOSE EL PRIMER TÉRMINO p Y LA RAZON q, CALCULAR LA SUMA S DE n TÉRMINOS.

1536. $p=5a^7+4b^2$; $q=a-b$; $n=13$.

1537. $p=3a^2+7b^5$; $q=5a^4-7b^2$; $n=15$.

1538. $p=2a^5-3b^2$; $q=a^7-1$; $n=13$.

1539. $p=a^9-1$; $q=b^5+1$; $n=11$.

1540. $p=13$; $q=17$; $n=43$.

1541. $p=14$; $q=\frac{7}{9}$; $n=18$.

1542. $p=17$; $q=\frac{5}{19}$; $n=59$.

1543. $p=\frac{7}{11}$; $q=13$; $n=83$.

1544. $p=\frac{7}{12}$; $q=\frac{5}{9}$; $n=43$.

§ V.—DADAS TRES DE LAS CINCO CANTIDADES p, q, u, n, S, DETERMINAR LAS OTRAS DOS.

1545. $q=a^5-b^2$; $n=11$; $S=a^5+3a^2b+b^3$.

1546. $q=|a+b|^2$; $n=13$; $S=a^2-b^2$.

1547. $q=8a-5$; $n=7$; $S=4b^2-27$.

1548. $q=8a^5-5b^5$; $n=17$; $S=18$.

1549. $q=a^5-1$; $n=13$; $u=|a-b|^2$.

1550. $q=5a^5-b^2$; $n=19$; $u=4a^2-5b^5$.

1551. $q=8a^5$; $n=27$; $u=41b^5-5$.

1552. $q=a^4-b^4$; $n=21$; $u=81$.

1553. $p=a+1$; $n=11$; $u=a-1$.

1554. $p=a^5+5b^2$; $n=31$; $u=a^{29}$.

1555. $p=a^8-3b^5$; $n=26$; $u=17a^5$.

1556. $p=a^7-5$; $q=b^6-3$; $n=23$.

1557. $p=a^8-b^7$; $q=b^5-3$; $n=25$.

1558. $p=a^{11}-43$; $q=b^5-\frac{5}{a^2}$; $n=49$.

1559. $p=a^{12}-\frac{b^4}{5c^3}$; $q=\frac{a^3}{b^2}-\frac{b^3}{c^2}$; $n=17$.

1560. $p=8$; $q=9$; $n=18$.

1561. $p=11$; $q=\frac{5}{4}$; $n=16$.

1562. $p=\frac{8}{11}$; $q=\frac{7}{9}$; $n=19$.

1563. $p=\frac{48}{49}$; $q=\frac{12}{13}$; $n=25$.

FIN DE LA PRIMERA PARTE DEL LIBRO PRIMERO.

Los ejercicios, problemas y discusiones de Algebra formarán un tomo de más de 600 páginas dividido en cuadernos de unas 150 cada uno, y conteniendo:

El 1.° los datos de los ejercicios de cálculo algebráico; el 2.° los resultados de estos; el 3.° los enunciados, planteos y soluciones de numerosos problemas sobre todas las partes del Algebra elemental; y el 4.° problemas sobre Mecánica, Física, Banca y Comercio con su resolucion y discusiones.

El precio de suscricion á cada cuaderno será el de **ocho** reales en Madrid y en las provincias. Terminada la impresion del 4.° no se venderán los cuadernos sueltos sino el tomo formado por los cuatro y á mayor precio.

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