

Guía N° 18
Expresiones Algebraicas y Factorización

Ejercicios:

I. Reduzca términos semejantes en las siguientes expresiones algebraicas:

1. $6x^2y - 3xy^2 + 6xy - 2x^2y + 8xy + 50$
2. $-3mn + 5m^3n^2 - 2mn^2 + 4mn - 21m^3n^2 + 2mn^2$
3. $2x + 3y + z - 7 + 5x - z + 12x - 17y + 5$
4. $3x^2 + 14xy - 11 + 6x^2 - 2x + 4 - x^2 - y - 2$

II. Multiplique:

1. $(2x^2 + 4x + 16)(3x - 4)$
2. $(3y^2 - 4y + 5)(4y + 5)$
3. $(7xy^2 - 4xy + 2y^2)(x^2 + 2xy - y^2)$
4. $(5y + 4x)(3x - 4y)$
5. $(2a - b)(4a + 5b)$
6. $(4a - b)(4a + b)$
7. $(6x^3 + 4y^2)^2$
8. $(5x + y)(5x - y)(25x^2 + y^2)$

III. Factorice:

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| 1. $18a^2b - 15ab^2$ | 2.- $5x^2y - 14xy$ |
| 3.- $a(x^2 - 3) + c(x^2 - 3)$ | 4.- $36x^2 - 16$ |
| 5.- $4xy^4 - 4xz^2$ | 6.- $y^2 - 6y + 9$ |
| 7.- $x^2 + 8x + 16$ | 8.- $25x^2 + 10x + 1$ |
| 9.- $x^2y^2 - 14xy + 49$ | 10.- $x^2y^2 - 16xy + 64$ |
| 11.- $4ax^2 + 20ax - 56a$ | 12.- $r^2 + 2rs + s^2 - t^2 + 2tv - v^2$ |
| 13. $5y^4 - 80x^4$ | 14.- $6y^4 - 96x^4$ |
| 15. $x^3 + 8$ | |

Factorice las siguientes expresiones:

1. $ac + ad + bc + bd$
2. $ax - ay + bx - by + cx - cy$
3. $pc + qc + pd + qd$
4. $rt + rv - st - sv$
5. $2ac - ad + 2bc - bd$
6. $xu - xv - yu + yv$
7. $2au + 2av - 3bu - 3bv$
8. $3a^2x + 3a^2y + b^2x + b^2y$
9. $2ac - 2ad + 3bc - 3bd$
10. $x + y + ax + ay$
11. $2a - 2b + ax - bx$
12. $3 + 15z + 4y + 20yz$
13. $a^2c^2 + a^2d^2 + b^2c^2 + b^2d^2$
14. $3ax^3 - 2bx^3 - 3ay^3 + 2by^3$
15. $1 + b + a + ab$
16. $a^2x^2y^2 + b^2x^2y^2 - 2a^2 - 2b^2$
17. $abc - 2abcz - xy + 2xyz$
18. $bd - 3bf + 2cd - 6cf$
19. $xp + 2xq - 2yp - 4yq + 4zp + 8zq$
20. $4 + 2c + 2d + 2a + ac + ad + 2b + bc + bd$
21. $a^2x^2 + x^2y^2 - x^2b + a^2y^2 + y^4 - y^2b - a^2 - y^2 + b$

Respuestas:

1. $(a + b)(c + d)$
2. $(a + b + c)(x - y)$
3. $(p + q)(c + d)$
4. $(r - s)(t + v)$
5. $(a + b)(2c - d)$
6. $(x - y)(u - v)$
7. $(2a - 3b)(u + v)$
8. $(3a^2 + b^2)(x + y)$
9. $(2a + 3b)(c - d)$
10. $(1 + a)(x + y)$
11. $(2 + x)(a - b)$
12. $(3 + 4y)(1 + 5z)$
13. $(a^2 + b^2)(c^2 + d^2)$
- *14. $(x^3 - y^3)(3a - 2b)$
15. $(1 + a)(1 + b)$
16. $(x^2y^2 - 2)(a^2 + b^2)$
17. $(abc - xy)(1 - 2z)$
18. $(b + 2c)(d - 3f)$
19. $(x - 2y + 4z)(p + 2q)$
20. $(2 + a + b)(2 + c + d)$
21. $(x^2 + y^2 - 1)(a^2 + y^2 - b)$

Factorice las siguientes expresiones:

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|----------------------|---------------------------|----------------------------|
| 1. $x^2 + 14x + 49$ | 12. $4x^2 + 20x + 25$ | 23. $x^2 - x - 6$ |
| 2. $x^2 + 8x + 16$ | 13. $9x^2 - 6x + 1$ | 24. $x^2 - 5x + 6$ |
| 3. $a^2 + 18a + 81$ | 14. $a^2 - 4ab + 4b^2$ | 25. $a^2 - 5a - 36$ |
| 4. $a^2 - 6a + 9$ | 15. $y^2 + 6xy + 9x^2$ | 26. $a^2 + a - 30$ |
| 5. $y^2 - 24y + 144$ | 16. $4t^2 + 12t + 9$ | 27. $a^2 + 8a + 7$ |
| 6. $x^2 + 10x + 25$ | 17. $4x^2 + 12xy + 9y^2$ | 28. $y^2 + y - 56$ |
| 7. $t^2 - 2t + 1$ | 18. $9x^2 - 30xy + 25y^2$ | 29. $x^4 - 6x^2 + 9$ |
| 8. $z^2 + 16z + 64$ | 19. $x^2 + 14xy + 49y^2$ | 30. $4 + 20y^2 + 25y^4$ |
| 9. $x^2 - 22x + 121$ | 20. $x^4 + 2x^2 + 1$ | 31. $x^4 + 2x^2y^2 + y^4$ |
| 10. $a^2 - 12a + 36$ | 21. $x^2 + 5x + 6$ | 32. $x^6 + 2x^3 + 1$ |
| 11. $1 + 6a + 9a^2$ | 22. $x^2 + x - 6$ | 33. $a^4 - 4a^2b^2 + 4b^4$ |

Respuestas:

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|----------------------|----------------------|----------------------|----------------------|----------------------|------------------|
| 1. $(x + 7)^2$ | 2. $(x + 4)^2$ | 3. $(a + 9)^2$ | 4. $(a - 3)^2$ | 5. $(y - 12)^2$ | 6. $(x + 5)^2$ |
| 7. $(t - 1)^2$ | 8. $(z + 8)^2$ | 9. $(x - 11)^2$ | 10. $(a - 6)^2$ | 11. $(1 + 3a)^2$ | 12. $(2x + 5)^2$ |
| 13. $(3x - 1)^2$ | 14. $(a - 2b)^2$ | 15. $(y + 3x)^2$ | 16. $(2t + 3)^2$ | 17. $(2x + 3y)^2$ | |
| 18. $(3x - 5y)^2$ | 19. $(x + 7y)^2$ | 20. $(x^2 + 1)^2$ | 21. $(x + 3)(x + 2)$ | 22. $(x + 3)(x - 2)$ | |
| 23. $(x - 3)(x + 2)$ | 24. $(x - 3)(x - 2)$ | 25. $(a - 9)(a + 4)$ | 26. $(a + 6)(a - 5)$ | | |
| 27. $(a + 7)(a + 1)$ | 28. $(y - 7)(y + 8)$ | 29. $(x^2 - 3)^2$ | 30. $(2 + 5y^2)^2$ | 31. $(x^2 + y^2)^2$ | |
| 32. $(x^3 + 1)^2$ | 33. $(a^2 - 2b^2)^2$ | | | | |

Factoricemos las siguientes expresiones:

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|---|--|------------------------------------|--------------------------------------|
| 1. $m^6 - n^3$ | 4. $t^3 - 64v^3$ | 7. $1 - 125a^3$ | 10. $216a^3 - 27b^3$ |
| 2. $x^3 + p^3$ | 5. $27x^3 + y^3$ | 8. $\frac{1}{x^3} + \frac{1}{y^3}$ | 11. $\frac{8}{z^3} - \frac{27}{y^3}$ |
| 3. $a^3 - 8b^3$ | 6. $8m^3 - \frac{n^6}{8}$ | 9. $16x^3 - 54y^3$ | 12. $125 - \frac{1}{8a^3}$ |
| 1. $(m^2 - n)(m^4 + m^2n + n^2)$ | 2. $(x + p)(x^2 - px + p^2)$ | | |
| 3. $(a - 2b)(a^2 + 2ab + 4b^2)$ | 4. $(t - 4v)(t^2 + 4tv + 16v^2)$ | | |
| 5. $(3x + y)(9x^2 - 3xy + y^2)$ | 6. $\left(2m - \frac{n^2}{2}\right)\left(4m^2 + mn^2 + \frac{n^4}{4}\right)$ | | |
| 7. $(1 - 5a)(1 + 5a + 25a^2)$ | 8. $\left(\frac{1}{x} + \frac{1}{y}\right)\left(\frac{1}{x^2} - \frac{1}{xy} + \frac{1}{y^2}\right)$ | | |
| 9. $2(2x - 3y)(4x^2 + 6xy + 9y^2)$ | 10. $27(2a - b)(4a^2 + 2ab + b^2)$ | | |
| 11. $\left(\frac{2}{z} - \frac{3}{y}\right)\left(\frac{4}{z^2} + \frac{6}{yz} + \frac{9}{y^2}\right)$ | 12. $\left(5 - \frac{1}{2a}\right)\left(25 + \frac{5}{2a} + \frac{1}{4a^2}\right)$ | | |