MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

OPERATIONS ON ALGEBRAIC EXPRESSIONS

Example

1. Add: 6a + 8b - 5c, 2b + c - 4a and a - 3b - 2c.

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2. Add: $5x^2 + 3x - 8$, $4x + 7 - 2x^2$ and $6 - 5x + 4x^2$

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3. Add: $8x^2 - 5xy - 3y^2$, $2xy - 6y^2 + 3x^2$ and $y^2 + xy - 6x^2$

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4. Subtract 4a + 5b - 3c from 6a - 3b + c

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5. Subtract $3x^2 - 6x - 4$ from $5 + x - 2x^2$

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6. 4 x y

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7. Find each of the following products:

(i) $5a^2b^2 \times \left(3a^2 - 4ab + 6b^2\right)$ (ii)

$\left(-3x^2y\right) \times \left(4x^2y - 3xy^2 + 4x - 5y\right)$

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8. Multiply (3x + 5y) and (5x - 7y).

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9. Multiply $\left(3x^2 + y^2\right)$ by $\left(2x^2 + 3y^2\right)$

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10. Multiply $\left(5x^2 - 6x + 9\right)$ by (2x - 3)

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11. Multiply $\left(2x^2 - 5x + 4\right)$ by $\left(x^2 + 7x - 8\right)$

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12. Multiply $\left(2x^3 - 5x^2 - x + 7\right)$ by $\left(3 - 2x + 4x^2\right)$

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13. Divide:

(i) $8x^2y^2$ by - 2xy (ii) $-15x^3yz^3$ by $-5xyz^2$

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14. Divide:

(i) $6x^5 + 18x^4 - 3x^2$ by $3x^2$ (ii) $20x^3y + 12x^2y^2 - 10xy$ by 2xy

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15. Divide $2x^2 + 3x + 1$ by (x + 1)

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16. Divide $9x - 6x^2 + x^3 - 2$ by (x - 2)

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17. Divide $\left(29x - 6x^2 - 28\right)$ by (3x - 4)

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18. $\left(5x^3 - 4x^2 + 3x + 18\right) by \left(3 - 2x + x^2\right)$

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19. Using division, show that (x - 1) is a factor of $\left(x^3 - 1\right)$

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20. Find the quotient and remainder when $\left(7 + 15x - 13x^2 + 5x^3\right)$ is divided by $\left(4 - 3x + x^2\right)$

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21. Divide $\left(10x^4 + 17x^3 - 62x^2 + 30x - 3\right)$ by $\left(2x^2 + 7x - 1\right)$

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22. Find each of the following products:

(i) (3x + 2y) (3x + 2y) (ii) $\left(4x^2 + 5\right)\left(4x^2 + 5\right)$

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23. Expand : (i) $(2x + 5y)^2$ (ii) $\left(\frac{2}{3}a + \frac{3}{4}b\right)^2$

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24. Find each of the following products:

(i) (4x - 7y) (4x - 7y) (ii) $\left(3x^2 - 4y^2\right)\left(3x^2 - 4y^2\right)$

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25. Expand (i) $(3x - 2y)^2$ (ii) $\left(\frac{3}{4}p - \frac{5}{6}q\right)^2$

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26. Find each of the following products:

(i) (4x + 5y) (4x - 5y) (ii) $\left(3x^2 + 2y^2\right)\left(3x^2 - 2y^2\right)$

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27. Evaluate the following using identities:

(i) $(105)^2$ (ii) $(47)^2$ (iii) (8.3×7.7)

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28. Find the value of the expression $25x^2 + 9y^2 + 30xy$. When x = 8 and y = 10.

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29. Find the value of the expression $\left(81x^2 + 16y^2 - 72xy\right)$ when $x = \frac{2}{3}$ and $y = \frac{3}{4}$

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30. If $x + \frac{1}{x} = 5$ find the values of (i) $x^2 + \frac{1}{x^2}$ and (ii) $x^4 + \frac{1}{x^4}$

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Exercise 6 A

1. Add:

$8ab, \ -5ab, 3ab, \ -ab$

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2. Add:

$7x, \ -3x, 5x, \ -x, \ -2x$

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3. Add:

$3a-4b+4c, 2a+3b-8c, a-6b+c$

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4. Add:

$5x - 8y + 2z, 3z - 4y - 2x, 6y - z - x$ and $3x - 2z - 3y$

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5. Add:

$6ax - 2by + 3cz, 6by - 11ax - cz$ and $1 - cz - 2ax - 3by$

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6. Add: $2x^3 - 9x^2 + 8, 3x^2 - 6x - 5, 7x^3 - 10x + 1$ and $3 + 2x - 5x^2 - 4x^3$

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7. Add:

$6p + 4q - r + 3, 3r - 5p - 6, 11q - 7p + 2r - 1$ and $2q - 3r + 4$

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8. Add:

$4x^2 - 7xy + 4y^2 - 3, 5 + 6y^2 - 8xy + x^2$ and

$6 - 2xy + 2x^2 - 5y^2$

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9. Subtract :

$3a^2b$ from $-5a^2b$

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10. Subtract :

$-8pq$ from $6pq$

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11. Subtract :

$-2abc$ from $-8abc$

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12. Subtract :

$16p$ from $-11p$

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13. Subtract :

$2a - 5b + 2c - 9$ from $3a - 4b - c + 6$

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14. Subtract :

$-6p + q + 3r + 8$ from $p - 2q - 5r - 8$

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15. Subtract : $x^3 + 3x^2 - 5x + 4$ from $3x^3 - x^2 + 2x - 4$

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16. Subtract :

$5y^4 - 3y^3 + 2y^2 + y - 1$ from $4y^4 - 2y^3 - 6y^2 - y + 5$

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17. Subtract :

$4p^2 + 5q^2 - 6r^2 + 7$ from $3p^2 - 4q^2 - 5r^2 - 6$

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18. what must be subtracted from $3a^2 - 6ab - 3b^2 - 1$ to get $4a^2 - 7ab - 4b^2 + 1$?

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19. The two adjacent sides of rectangle are $5x^2 - 3y^2$ and $x^2 + 2xy$. Find the perimeter

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20. The perimeter of a triangle is $6p^2 - 4p + 9$ and two of its sides are $p^2 - 2p + 1$ and $3p^2 - 5p + 3$. Find the third side of the triangle.

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Exercise 6 B

1. Find each of the following products :

$(5x + 7) \times (3x + 4)$

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2. Find each of the following products :

$(4x + 9) \times (x - 6)$

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3. Find each of the following products :

$(2x + 5) \times (4x - 3)$

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4. Find each of the following products :

$(3y - 8) \times (5y - 1)$

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5. Find each of the following products :

$(7x + 2y) \times (x + 4y)$

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6. Find each of the following products :

$(9x + 5y) \times (4x + 3y)$

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7. Find each of the following products :

$(3m - 4n) \times (2m - 3n)$

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8. Find each of the following products :

$(x^2 - a^2) \times (x - a)$

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9. Find each of the following products :

$(x^2 - y^2) \times (x + 2y)$

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10. Find each of the following products :

$(3p^2 + q^2) \times (2p^2 - 3q^2)$

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11. Find each of the following products :

$(2x^2 - 5y^2) \times (x^2 + 3y^2)$

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12. Find each of the following products :

$(x^3 - y^3) \times (x^2 + y^2)$

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13. Find each of the following products :

$(x^4 + y^4) \times (x^2 - y^2)$

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14. $\left(x^4+\frac{1}{x^4}\right)\times\left(x+\frac{1}{x}\right)$

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15. Find each of the following products :

$\left(x^2-3x+7\right)\times(2x+3)$

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16. Find each of the following products :

$\left(3x^2+5x-9\right)\times(3x-5)$

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17. Find each of the following products :

$\left(x^2 - xy + y^2\right) \times (x + y)$

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18. Find each of the following products :

$\left(x^2 + xy + y^2\right) \times (x - y)$

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19. Find each of the following products :

$\left(x^3 - 2x^2 + 5\right) \times (4x - 1)$

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20. Find each of the following products :

$(9x^2 - x + 15) \times (x^2 - 3)$

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21. Find each of the following products :

$(x^2 - 5x + 8) \times (x^2 + 2)$

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22. Find each of the following products :

$(x^3 - 5x^2 + 3x + 1) \times (x^2 - 3)$

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23. Find each of the following products :

$(3x + 2y - 4) \times (x - y + 2)$

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24. Find each of the following products :

$(x^2 - 5x + 8) \times (x^2 + 2x - 3)$

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25. Find each of the following products :

$(2x^2 + 3x - 7) \times (3x^2 - 5x + 4)$

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26. Find each of the following products :

$(9x^2 - x + 15) \times (x^2 - x - 1)$

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Exercise 6 C

1. Divide:

(i) $24x^2y^3$ by 3xy (ii) $36xyz^2$ by -9xz

(iii) $-72x^2y^2z$ by - 12 xyz (iv) $-56mnp^2$ by 7 mnp

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2. Divide:

(i) $5m^2 - 30m^2 + 45m$ by 5m (ii) $8x^2y^2 - 6xy + 10x^2y^3$ by 2xy

(iii) $9x^2y - 6xy + 12xy^2$ by - 3xy (iv) $12x^4 + 8x^3 - 6x^2$ by $-2x^2$

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3. Write the quotient and remainder when we divide :

$\left(x^2 - 4x + 4\right)$ by (x - 2)

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4. Write the quotient and remainder when we divide :

$\left(x^2 - 4\right)$ by (x + 2)

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5. Write the quotient and remainder when we divide :

$\left(x^2 + 12x + 35\right)$ by (x + 7)

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6. Write the quotient and remainder when we divide :

$\left(15x^2 + x - 6\right)$ by (3x + 2)

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7. Write the quotient and remainder when we divide :

$\left(14x^2 - 53x + 45\right)$ by (7x - 9)

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8. Write the quotient and remainder when we divide :

$\left(6x^2 - 31x + 47\right)$ by (2x - 5)

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9. Write the quotient and remainder when we divide :

$\left(2x^3 + x^2 - 5x - 2\right)$ by (2x + 3)

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10. Write the quotient and remainder when we divide :

$\left(x^3 + 1\right)$ by (x + 1)

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11. Write the quotient and remainder when we divide :

$(x^4 - 2x^3 + 2x^2 + x + 4)$ by $(x^2 + x + 1)$

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12. Write the quotient and remainder when we divide :

$(x^3 - 6x^2 + 11x - 6)$ by $(x^2 - 5x + 6)$

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13. Write the quotient and remainder when we divide :

$(5x^3 - 12x^2 + 12x + 13)$ by $(x^2 - 3x + 4)$

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14. Write the quotient and remainder when we divide :

$(2x^3 - 5x^2 + 8x - 5)$ by $(2x^2 - 3x + 5)$

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15. Write the quotient and remainder when we divide :

$(8x^4 + 10x^3 - 5x^2 - 4x + 1)$ by $(2x^2 + x - 1)$

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Exercise 6 D

1. Find each of the following products:

(i) $(x + 6)(x + 6)$ (ii) $(4x + 5y)(4x + 5y)$ (iii) $(7a + 9b)(7a + 9b)$

(iv) $\left(\frac{2}{3}x+\frac{4}{5}y\right)\left(\frac{2}{3}x+\frac{4}{5}y\right)$ (v) $\left(x^2+7\right)\left(x^2+7\right)$ (vi) $\left(\frac{5}{6}a^2+2\right)\left(\frac{5}{6}a^2+2\right)$

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2. Find each of the following products:

(i) $(x-4)(x-4)$ (ii) $(2x-3y)(2x-3y)$ (iii) $\left(\frac{3}{4}x-\frac{5}{6}y\right)\left(\frac{3}{4}x-\frac{5}{6}y\right)$

(iv) $\left(x-\frac{3}{x}\right)\left(x-\frac{3}{x}\right)$ (v) $\left(\frac{1}{3}x^2-9\right)\left(\frac{1}{3}x^2-9\right)$ (vi) $\left(\frac{1}{2}y^2-\frac{1}{3}y\right)\left(\frac{1}{2}y^2-\frac{1}{3}y\right)$

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3. (i) 64 a 2 + 9 b 2 + 48 a b (ii) 49 x 2 + 4 y 2 + 28 x y (iii) 25 x 2 + 110 x + 121 (iv) a 2 4 + 4 a 2 + 2 (v) 9 x 2 16 + 4 y 2 81 + 1 3 x y (vi)

81 x 2 − 180 x + 100 (vii) x 4 y 2 + y 2 z 4 − 2 x 2 y 2 z 2 (viii) x 2 y 2 + y 2 x 2 − 2 (ix) 9 m 2 + 16 25 n 2 − 24 5 m n

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4. Find each of the following products:

(i) $(x+3)(x-3)$ (ii) $(2x+5)(2x-5)$ (ii) $(8+x)(8-x)$ (iv) $(7x+11y)(7x-11y)$ (v) $\left(5x^2+\frac{3}{4}y^2\right)\left(5x^2-\frac{3}{4}y^2\right)$ (vi) $\left(\frac{4x}{5}-\frac{5y}{3}\right)\left(\frac{4x}{5}+\frac{5y}{3}\right)$ (vii) $\left(x+\frac{1}{x}\right)\left(x-\frac{1}{x}\right)$ (viii) $\left(\frac{1}{x}+\frac{1}{y}\right)\left(\frac{1}{x}-\frac{1}{y}\right)$ (ix) $\left(2a+\frac{3}{b}\right)\left(2a-\frac{3}{b}\right)$

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5. Using the formula for squaring a binomial, evaluate the following:

(i) $(54)^2$ (ii) $(82)^2$ (iii) $(103)^2$ (iv) $(704)^2$

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6. Using the formula for squaring a binomial evaluate the following:

(i) $(69)^2$ (ii) $(78)^2$ (iii) $(197)^2$ (iv) $(999)^2$

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7. Find the value of:

(i) $(82)^2 - (18)^2$ (ii) $(128)^2 - (72)^2$ (iii) 197×203

(iv) $\frac{198 \times 198 - 102 \times 102}{96}$ (v) (14.7×15.3) (vi) $(8.63)^2 - (1.37)^2$

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8. Find the value of the expression $\left(9x^2 + 24x + 16\right)$, when x = 12

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9. find the value of the expression $\left(64x^2 + 81y^2 + 144xy\right)$ when x = 11 and $y = \frac{4}{3}$

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10. Find the value of the expression $\left(36x^2 + 25y^2 - 60xy\right)$, when $x = \frac{2}{3}$ and $y = \frac{1}{5}$

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11. If $x + \frac{1}{x} = 4$; Find (i) $x^2 + \frac{1}{x^2}$ (ii) $x^4 + \frac{1}{x^4}$

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12. If $\left(x - \frac{1}{x}\right) = 5$, find the value of $\left(x^2 + \frac{1}{x^2}\right)$

A. 34

B. 42

C. 27

D. 63

Answer: C

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13. Find the continued product:

(i) $(x+1)(x-1)\left(x^2+1\right)$

(ii) $(x-3)(x+3)\left(x^2+9\right)$

(iii) $(3x-2y)(3x+2y)\left(9x^2+4y^2\right)$

(iv) $(2p+3)(2p-3)\left(4p^2+9\right)$

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14. If $x+y=12$ and $xy=14$ find the values of x^2+y^2.

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15. If $x-y=7\,and\,xy=9,$ find the value of x^2+y^2

A. 67

B. 57

C. 47

D. 37

Answer: A

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Exercise 6 E Tick The Correct Answer In Each Of The Following

1. The sum of $(6a + 4b - c + 3), (2b - 3c + 4), (11b - 7a + 2c - 1)$ and $(2c - 5a - 6)$ is

A. $(4a - 6b + 2)$

B. (-3a + 14b - 3c + 2)

C. $(-6a+17b)$

D. $(-6a+6b+c-4)$

Answer: C

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2. $(3q+7p^2-2r^3+4)-(4p^2-2q+7r^3-3)=?$

A. $(p^2+2q+5r^3+1)$

B. $(11p^2+q+5r^3+1)$

C. $(-3p^2-5q+9r^3-7)$

D. $(3p^2+5q-9r^3+7)$

Answer: D

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3. (x + 5)(x - 3) = ?

A. $x^2 + 5x - 15$

B. $x^2 - 3x - 15$

C. $x^2 + 2x + 15$

D. $x^2 + 2x - 15$

Answer: D

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4. (2x + 3)(3x - 1) = ?

A. $\left(6x^2 + 8x - 3\right)$

B. $\left(6x^2 + 7x - 3\right)$

C. $\left(6x^2 - 7x - 3\right.$

D. $\left(6x^2 - 7x + 3\right)$

Answer: B

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5. (x + 4)(x + 4) = ?

A. $\left(x^2 + 16\right)$

B. $\left(x^2 + 4x + 16\right)$

C. $\left(x^2 + 8x + 16\right)$

D. $\left(x^2 + 16x\right)$

Answer: C

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6. (x - 6)(x - 6) = ?

A. $(x^2 - 36)$

B. $(x^2 + 36)$

C. $(x^2 - 6x + 36)$

D. $(x^2 - 12x + 36)$

Answer: D

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7. $(2x + 5)(2x - 5) = ?$

A. $(4x^2 + 25)$

B. $(4x^2 - 25)$

C. $\left(4x^2 - 10x + 25\right)$

D. $\left(4x^2 + 10x - 25\right)$

Answer: B

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8. $\frac{8a^2b^3}{-2ab} = ?$

A. $4ab^2$

B. $4a^2b$

C. $-4ab^2$

D. $-4a^2b$

Answer: C

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9. $\left(2x^2 + 3x + 1\right) / (x + 1) = \ ?$

A. (x + 1)

B. (2x + 1)

C. (x + 3)

D. (2x + 3)

Answer: B

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10. $\left(x^2 - 4x + 4\right) / (x - 2) = \ ?$

A. (x - 2)

B. (x + 2)

C. (2 - x)

D. $\left(2+x+x^2\right)$

Answer: A

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11. $(a+1)(a-1)\left(a^2+1\right)=?$

A. $\left(a^4-2a^2-1\right)$

B. $\left(a^4-a^2-1\right)$

C. $\left(a^4-1\right)$

D. $\left(a^4+1\right)$

Answer: C

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12. $\left(\frac{1}{x}+\frac{1}{y}\right)\left(\frac{1}{x}-\frac{1}{y}\right)=?$

A. $\left(\frac{1}{x^2}-\frac{1}{y^2}\right)$

B. $\left(\frac{1}{x^2}+\frac{1}{y^2}\right)$

C. $\left(\frac{1}{x^2}+\frac{1}{y^2}-\frac{1}{xy}\right)$

D. $\left(\frac{1}{x^2}-\frac{1}{y^2}+\frac{1}{xy}\right)$

Answer: A

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13. If $\left(x-\frac{1}{x}\right)=5$ then $\left(x^2+\frac{1}{x^2}\right)$ = ?

A. 25

B. 27

C. 23

D. $25\frac{1}{25}$

Answer: C

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14. If $\left(x-\frac{1}{x}\right)=6$, then $\left(x^2+\frac{1}{x^2}\right)=?$

A. 36

B. 38

C. 32

D. $36\frac{1}{36}$

Answer: B

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15. Simplify the following using the formula: $(a-b)(a+b)=a^2-b^2$: $(82)^2-(18)^2$ (ii) $(467)^2-(33)^2$

A. 8218

B. 6418

C. 6400

D. 7204

Answer: C

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16. $(197 \times 203) = ?$

A. 39991

B. 39999

C. 40009

D. 40001

Answer: A

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17. If (a + b) = 12 and ab = 14, then $\left(a^2 + b^2\right) = ?$

A. 172

B. 116

C. 162

D. 126

Answer: B

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18. If (a - b) = 7 and ab = 9, then $\left(a^2 + b^2\right)$ = ?

A. 67

B. 31

C. 40

D. 58

Answer: A

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19. If x = 10, then the value of $\left(4x^2 + 20x + 25\right) = ?$

A. 256

B. 425

C. 625

D. 575

Answer: C

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