



MATHS

BOOKS - MTG IIT JEE FOUNDATION

ALGEBRAIC EXPRESSIONS

Illustrations

1. Subtract: $x^2 - 3xy + 7y^2 - 2$ from $6xy - 4x^2 - y^2 + 5$

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2. Subtract : $3x + 4y - 2z$ from the sum of $3 + 4z + 3y - x$ and $3x + 2y - 3z + 2$.

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3. Find the value of the expression for the given value of x .

$$2x - 4, \text{ when } x=3.$$

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4. Find the value of the expression for the given value of x .

$$5x^2 + 3x - 2, \text{ when } x=2.$$

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5. Find the value of the expression for the given value of x .

$$900 - 10x^3, \text{ when } x=4.$$

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6. Find the value of the expression for the given value of x .

$$x^3 + 7x^2 + 8x - 1, \text{ when } x = -2.$$

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7. Find the value of the expressions, when $a = -1$ and $b = 3$

$$a^2 + b^2 + 2ab$$

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8. Find the value of the expressions, when $a = -1$ and $b = 3$

$$5a^2 + 4ab^2 - 8a^2b.$$

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9. Find the value of the expressions, when

$$p = -3, q = -1 \text{ and } r = 2$$

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

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10. Find the value of the expressions, when

$$p = -3, q = -1 \text{ and } r = 2$$

$$4pq^2 + 7qr - 6pr$$



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Solved Examples

1. Simplify : $4k - 3k^2 - 5k + 6$



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2. Find the value of $\frac{4c^2}{6} - 25$. When $c = 9$.



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3. Find the value of $3a + 2bc - 3d^3$, given that $a = 5, b = 4, c = 3$ and $d = 2$.

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4. The length of rectangle is three times its breadth. If the perimeter of the rectangle is 96 metres, then find the length and breadth of the rectangle.

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5. Subtract the sum of $10m - 8n + 6p^2$ and $-7m - 4n + 12p^2$ from the sum $2m - 4n + 6p^2$ and $m - 8n + 12p^2$.

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6. If $A = 3a - 2b$, $B = -2a + 3b$ and $C = -a - b$, then find $A + B + C$.

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7. What should be added to $x^2 + xy + y^2$ to obtain $4x^2 + 8xy$?



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8. Subtract the sum of $7x^2 - 4y^2$ and $4x^2 + 3xy - 4y^2$ from the sum of $5x^2 - 3xy - y^2$ and $x^2 + 2xy - 2y^2$.



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9. Find the sum of the expressions:

$x + xy^2 + y + ax^2, 2ax^2 - 2y + 3x, -5xy^2 - ax^2 - 2y, -5x + 3y - 2a$

.



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10. Identify like terms in the following:

$-x^2y, -4y^2x, 7y^2, 2x^2y, 3y, -4y^2, -100y, 12xy, 10xy^2, -6y^2x^2, 4yx, 1$



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11. Identify like terms in the following:

$4ab, 7a, 8b, -3a^2b^2, -4ba, -50b, -75, 15b^2a^2, -7a^2, 45, 150a, 70ba, 10$



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12. Classify into monomials, binomials and trinomials:

$3x - 5y$.



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13. Classify into monomials, binomials and trinomials:

x^2



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14. Classify into monomials, binomials and trinomials:

$$a + b - ab$$



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15. Classify into monomials, binomials and trinomials:

$$50$$



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16. Classify into monomials, binomials and trinomials:

$$2x^2 + y(2) - xy$$



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17. The length of a rectangle is 6 m more than its breadth. The perimeter of the rectangle is 60 m. Find the length and breadth of the rectangle.

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18. The perimeter of a rectangle is 36 m. Its length is 2 m greater than its breadth. Find its length and breadth.

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19. Write each of the following statements in equation:

A number x increased by 5 equals 12.

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20. Write each of the following statements in equation:

Thrice a number x decreased by 5 is equal to 27.

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21. Write each of the following statements in equation:

20 decreased by a number x is equal to 15

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22. Subtract $5x^2 - 3xy + 2y^2$ from $7x^2 - 5xy - 8y^2$.

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23. Find the number of dots in the pattern 143 of the following pattern.



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24. Priya borrowed Rs 2000 for t years at the rate of $r\%$ p.a. If interest is calculated as simple interest, then find the algebraic expression to find amount.



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25. When $a = 2$, $b = -1$, $c = 0$, find the value of expression $2a^2b + 2ab^2 + 2abc$.



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26. Find the value of $16a^2 + 24a + 9$ when $a = 9$.



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1. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of z from y . (ii) One-half of the sum of numbers x and y . (iii) The number z multiplied by itself. (iv) One-fourth of the product



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2. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of z from y . (ii) One-half of the sum of numbers x and y . (iii) The number z multiplied by itself. (iv) One-fourth of the product



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3. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of z from y . (ii) One-half of the sum of numbers x and y . (iii) The number z multiplied by itself. (iv) One-fourth of the product



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4. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of z from y . (ii) One-half of the sum of numbers x and y . (iii) The number z multiplied by itself. (iv) One-fourth of the product



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5. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of z from y . (ii) One-half of the sum of numbers x and y . (iii) The number z multiplied by itself. (iv) One-fourth of the product



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6. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of z from y . (ii) One-

half of the sum of numbers x and y . (iii) The number z multiplied by itself.

(iv) One-fourth of the product

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7. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of z from y . (ii) One-half of the sum of numbers x and y . (iii) The number z multiplied by itself.

(iv) One-fourth of the product



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8. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations. (i) Subtraction of z from y . (ii) One-half of the sum of numbers x and y . (iii) The number z multiplied by itself.

(iv) One-fourth of the product



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9. (i) Identify the terms and their factors in the following expressions

Show the terms and factors by tree diagrams. (a)  $x - \{\rm\}$ 3 



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10. (i) Identify the terms and their factors in the following expressions Show

the terms and factors by tree diagrams. (a)  $x - \{\rm\}$ 3 



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11. (i) Identify the terms and their factors in the following expressions Show

the terms and factors by tree diagrams. (a)  $x - \{\rm\}$ 3 

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12. (i) Identify the terms and their factors in the following expressions Show

the terms and factors by tree diagrams. (a)  $x - \{\rm\}$ 3 

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13. Identify the terms and their factors in the following expressions. Show the terms and factors by tree diagrams.

$$-ab + 2b^2 - 3a^2$$

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14. Identify terms and factors in the expressions given below:

$$-4x + 5$$

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15. Identify terms and factors in the expressions given below:

$$-4x + 5y$$

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16. Identify terms and factors in the expressions given below:

$$5y + 3y^2$$

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17. Identify terms and factors in the expressions given below:

$$xy + 2x^2y^2$$

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18. Identify terms and factors in the expressions given below:

$$Pq + q$$

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19. Identify terms and factors in the expressions given below:

$$1.2ab - 2.4b + 3.6a$$





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20. Identify terms and factors in the expressions given below:

$$\frac{3}{4}x + \frac{1}{4}$$





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21. Identify terms and factors in the expressions given below:



$$0.1p^2 + 0.2q^2$$





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22. Identify the numerical coefficients of terms (other than constants) in the following expressions: (i)  $5\{\rm{ }}-\{\rm{ }}3\{t^2}$ 



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23. Identify the numerical coefficients of terms (other than constants) in the following expressions: (i)  $5\{\rm{ }}-\{\rm{ }}3\{t^2}$ 

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24. Identify the numerical coefficients of terms (other than constants) in the following expressions: (i)  $5\{\rm{ }}-\{\rm{ }}3\{t^2}$ 

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25. Identify the numerical coefficients of terms (other than constants) in the following expressions: (i)  $5\{\rm{ }}-\{\rm{ }}3\{t^2}$ 

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26. Identify the numerical coefficients of terms (other than constants) in the following expressions:

$$-p^2q^2 + 7pq$$

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27. Identify the numerical coefficients of terms (other than constants) in the following expressions:

$$1.2a + 0.8b$$

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28. Identify the numerical coefficients of terms (other than constants) in the following expressions:

$$3.14r^2$$

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29. Identify the numerical coefficients of terms (other than constants) in the following expressions:

$$2(l + b)$$


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30. Identify the numerical coefficients of terms (other than constants) in the following expressions:

$$0.1y + 0.01y^2$$


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31. (a) Identify terms which contain x and give the coefficient of x . (i)


$$\{y^2\}x + y$$


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32. (a) Identify terms which contain x and give the coefficient of x . (i)


$$\{y^2\}x + y$$

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33. (a) Identify terms which contain x and give the coefficient of x . (i)


$$\{y^2\}x + y$$



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34. Identify terms which contains x and give the coefficient of x .

$$5 + z + zx$$



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35. Identify terms which contains x and give the coefficient of x .

$$1 + x + xy$$



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36. Identify terms which contains x and give the coefficient of x .

$$12xy^2 + 25$$



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37. Identify terms which contains x and give the coefficient of x .

$$7x + xy^2$$

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38. Identify terms which contains y^2 and give the coefficient of y^2 .

$$8 - xy^2$$

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39. Identify terms which contains y^2 and give the coefficient of y^2 .

$$5y^2 + 7x$$

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40. Identify terms which contains y^2 and give the coefficient of y^2 .

$$2x^2y - 15xy^2 + 7y^2$$



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41. Classify into monomials, binomials and trinomials.

$$4y - 7z$$

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42. Classify into monomials, binomials and trinomials.

$$y^2$$

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43. Classify into monomials, binomials and trinomials.

$$x + y - xy$$

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44. Classify into monomials, binomials and trinomials.

100

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45. Classify into monomials, binomials and trinomials.

$$ab - a - b$$

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46. Classify into monomials, binomials and trinomials.

$$5 - 3t$$

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47. Classify into monomials, binomials and trinomials.

$$4p^2q - 4pq^2$$



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48. Classify into monomials, binomials and trinomials.

$$7mn$$

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49. Classify into monomials, binomials and trinomials.

$$x^2 - 3z + 8$$

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50. Classify into monomials, binomials and trinomials.

$$a^2 + b^2$$

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51. Classify into monomials, binomials and trinomials.

$$z^2 + z$$

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52. Classify into monomials, binomials and trinomials.

$$1 + x + x^2$$

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53. State whether a given pair of terms is of like or unlike terms.

1, 100

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54. State whether a given pair of terms is of like or unlike terms. (i) 1, 100 (ii)

$7x$,  $\frac{5}{2}x$ 

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55. State whether a given pair of terms is of like or unlike terms. (i) 1, 100 (ii)

$7x, \frac{5}{2}x$

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56. State whether a given pair of terms is of like or unlike terms. (i) 1, 100 (ii)

$7x, \frac{5}{2}x$

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57. State whether a given pair of terms is of like or unlike terms.

$4m^2p, 4mp^2$

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58. State whether a given pair of terms is of like or unlike terms.

$12xz, 12x^2z^2$

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59. Identify like terms in the following: (a)



$-x^2, 4y^2, 8x^2, 2x^2y, 7y, 11x^2, 100x, 11yx, 20x^2$

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60. Identify like terms in the following: (a)



$-x^2, 4y^2, 8x^2, 2x^2y, 7y, 11x^2, 100x, 11yx, 20x^2$

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1. Simplify combining like terms:

$$21b - 32 + 7b - 20b$$

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2. Simplify combining like terms:

$$-z^2 + 13z^2 - 5z + 7z^3 - 15z$$

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3. Simplify combining like terms:

$$p - (p - q) - q - (q - p)$$

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4. Simplify combining like terms:

$$3a - 2b - ab - (a - b + ab) + 3ab + b - a$$





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5. Simplify combining like terms:

$$5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2$$



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6. Simplify combining like terms:

$$(3y^2 + 5y - 4) - (8y - y^2 - 4)$$



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7. Add :

(i) $3mn - 5mn, 8mn - 4mn$

(ii) $t - 8tz, 3tz - z, z - t$



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8. Add: (i)  $3mn, -5mn, 8mn, -4mn$ 

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9. Add:

$$-7mn + 5, 12mn + 2, 9mn - 8, -2mn - 3$$

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10. Add:

$$a + b - 3, b - a + 3, a - b + 3$$

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11. Add :

$$14x + 10y - 12xy - 13, 18 - 7x - 10y + 8xy, 4xy$$

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12. Add:

$$5m - 7n, 3n - 4m + 2, 2m - 3mm - 5$$

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13. Add :

$$4x^2y, -3xy^2, -5xy^2, 5x^2y$$

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14. Add :

$$3p^2q^2 - 4pq + 5, -10p^2q^2, 15 + 9pq + 7p^2q^2$$

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15. Add:

$$ab - 4a, 4b - ab, 4a - 4b$$





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16. Add:

$$x^2y^2 - 1, y^2 - 1 - x^2, 1 - x^2 - y^2$$



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17. Subtract:

$$5y^2 \text{ from } y^2$$



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18. Subtract:

$$6xy \text{ from } -12xy$$



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19. Subtract:

$$(a - b) \text{ from } (a + b)$$

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20. Subtract:

$$a(b - 5) \text{ from } b(5 - a)$$

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21. Subtract:

$$-m^2 + 5mn \text{ from } 4m^2 - 3mn + 8$$

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22. Subtract:

$$-x^2 + 10x - 5 \text{ from } 5x - 10$$



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23. Subtract:


$$5a^2 - 7ab + 5b^2 \text{ from } 3ab - 2a^2 - 2b^2$$

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24. Subtract:

$$4pq - 5a^2 - 3p^2 \text{ from } 5p^2 + 3q^2 - pq$$

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25. (a) What should be added to  $\{x^2\} + xy + \{y^2\}$

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26. What should be subtracted from $2a + 8b + 10$ to get $-3a + 7b + 16$?

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27. What should be taken away from

 $3x^2 - 4y^2 + 5xy + 20$ 

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28. (a) From the sum of  $3x - y + 11$ 

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29. From the sum of $4 + 3x$ and $5 - 4x + 2x^2$ subtract the sum of $3x^2 - 5x$ and $-x^2 + 2x + 5$

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1. If $m = 2$, find the value of :

$$m - 2$$

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2. If  $m = \{\text{rm}\{ \}\}2$

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3. If  $m = \{\text{rm}\{ \}\}2$

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4. If $m=2$, find the value of (i) $m - 2$ (ii) $3m - 5$ (iii) $9 - 5m$ (iv) $3m^2 - 2m - 7$

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5. If $m = 2$, find the value of :

$$\frac{5m}{2} - 4$$



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6. If  $p = \{\text{rm{ }}\} - \{\text{rm{ }}\}^2$ 


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7. If  $p = \{\text{rm{ }}\} - \{\text{rm{ }}\}^2$ 


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8. If  $p = \{\text{rm{ }}\} - \{\text{rm{ }}\}^2$ 


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9. Find the value of the following expressions, when  $x = \{\text{rm{ }}\} - 1$


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10. Find the value of the following expressions, when  $x = \{\rm{ }}-1$

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11. Find the value of the following expressions, when  $x = \{\rm{ }}-1$

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12. Find the value of the following expressions, when  $x = \{\rm{ }}-1$

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13. If $a = 2$, $b = -2$, then find the value of :



$$a^2 + b^2$$

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14. If $a = 2$, $b = -2$, then find the value of :

$$a^2 + ab + b^2$$



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15. If  $a = 2, b = -2$ 



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16. When  $a = 0, b = 1$ 



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17. When  $a = 0, b = 1$ 

[Watch Video Solution](#)



18. When  $a = 0, b = 1$ 

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19. When  $a = 0, b = -1$ 

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20. Simplify the expressions and find the value if x is equal to 2 (i)

 $x + 7 + 4 \left(x - 5 \right)$ 

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21. Simplify the expressions and find the value, if x is equal to 2

$$3(x + 2) + 5x - 7$$

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22. Simplify the expressions and find the value, if x is equal to 2

$$6x + 5(x - 2)$$

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23. Simplify the expressions and find the value, if x is equal to 2

$$4(2x - 1) + 3x + 11$$

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24. find the value of expressions if x is equal to 7,

$$5x - 10 - 2x + 15$$

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25. Simplify these expressions and find their values if $x = 3$,

$$2 - 8x + 4x + 4$$

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26. Simplify these expressions and find their values if

$$x = 3, a = -1, b = -2.$$

$$3a + 5 - 8a + 1$$

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27. Simplify these expressions and find their values if

$$x = 3, a = -1, b = -2.$$

$$10 - 3b - 4 - 5b$$

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28. Simplify these expressions and find their values if

$$x = 3, a = -1, b = -2.$$

$$2a - 2b - 4 - 5 + a$$

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29. If $z = 10$. find the value of $z^3 - 3(z - 10)$.

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30. if $p = -10$. find the value of $p^2 - 2p - 100$.

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31. What should be the value of a if the value of $10x^3 - a$ equals to 9, when $x = 0$?






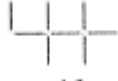



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32. Simplify the expression and find its value when $a = 3$ and $b = 1$.

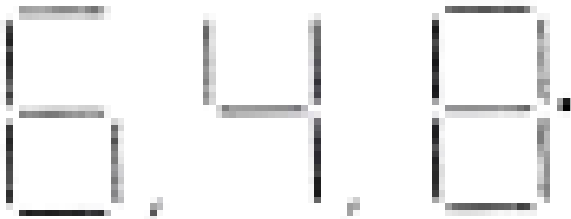
$$2(a^2 + ab) + 3 - ab$$

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1. Observe the patterns of digits made from line segments of equal length. You will find such segmented digits on the display of electronic watches or calculators.

(a)			
	6	11	16	21...	$(5n + 1)...$
(b)			
	4	7	10	13...	$(3n + 1)...$
(c)			
	7	12	17	22...	$(5n + 2)...$

If the number of digits formed is taken to be n , the number of segments required to form n digits is given by the algebraic expression appearing on the right of each pattern. How many segments are required to form 5, 10, 100 digits of the kind



2. Use the given algebraic expression to complete the table of number patterns.

S.No.	Expression	Terms									
		1 st	2 nd	3 rd	4 th	5 th	...	10 th	...	100 th	...
1.	$2n - 1$	1	3	5	7	9	—	19	—	—	—
2.	$3n + 2$	5	8	11	14	—	—	—	—	—	—
3.	$4n + 1$	5	9	13	17	—	—	—	—	—	—
4.	$7n + 20$	27	34	41	48	—	—	—	—	—	—
5.	$n^2 + 1$	2	5	10	17	—	—	—	—	10,001	—



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Exercise Multiple Choice Question Level 1

1. Latika is $6m$ years old. She is thrice as old as her sister. What will be their total age after six years?

- A. $(8m + 12)$ years
- B. $(8m + 6)$ years
- C. $(6m + 6)$ years
- D. $(5m + 10)$ years

Answer: A



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2. Simplify : $4k - 3k^2 - 5k + 6$

A. $k^2 + k + 4$

B. $-3k^2 - k + 6$

C. $3k^2 - 9k + 4$

D. $3k^2 - 9k - 4$

Answer: B



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3. Find the value of $\frac{4c^2}{6} - 25$ when $c = 12$.

A. 24

B. 71

C. 29

D. 35

Answer: B



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4. Find the value of $\frac{8g^2}{3} - 2g + 7$ when $g = 3$

A. 9

B. 25

C. 17

D. 26

Answer: B



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5. Kiran spent Rs $6x$ on a book, Rs 6 on food and had Rs 18 left. What was the sum of money she had at first? Express your answer in terms of x .

- A. Rs $(6x + 18)$
- B. Rs $(6x + 24)$
- C. Rs $64x$
- D. Rs $24x$

Answer: B



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6. Beena bought m pencils at n paise each. How much change did she get back, if she paid Rs 20 ?

- A. Rs $\left(20 - \frac{mn}{100}\right)$
- B. Rs $(2 - m - n)$
- C. Rs $(200 - m - n)$

D. $Rs\left(200 - \frac{mn}{100}\right)$

Answer: A

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7. The sum of $3p^2q^2 - 5pq + 4$ and $7 + 7pq - 2p^2q^2$ is equal to

A. $p^2q^2 - 2pq + 11$

B. $-p^2q^2 + 2pq + 11$

C. $-p^2q^2 - 2pq + 11$

D. $p^2q^2 + 2pq + 11$

Answer: D

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8. Subtracting $3xy + 5yz - 7zx$ from $5xy - 2zx + 10xyz$, we get

A. $2xy - 5yz + 5zx + 10xyz$

B. $2xy + 5yz - 5zx + 10xyz$

C. $2xy + 5yz + 5zx - 10xyz$

D. $2xy + 5yz + 5zx - 10xyz$

Answer: A

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9. The sum of $-2xy$ and $-5xy$ is equal to

A. $-7xy$

B. $-3xy$

C. $7xy$

D. $3xy$

Answer: A

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10. The sum of $-a$ and $-a^2$ subtracted from a^3 gives

A. $-a^6$

B. a^6

C. $a - a^2 + a^3$

D. $a + a^2 + a^3$

Answer: D



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11. If the sides of a triangle are $3p$, $4p - 2$ and $5p + 1$. Find the perimeter of the triangle.

A. $9p - 3$

B. $7p - 1$

C. $12p - 1$

D. $8p - 3$

Answer: C



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12. If the perimeter of a triangle is $8x - 7$ and two sides are $3x + 5$ and $2x - 3$, find the third side.

A. $7x - 9$

B. $3x - 6$

C. $6x - 7$

D. $3x - 9$

Answer: D



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13. What should be added to $-6y^2 + 3x$ to get $-3y^2 + 5x$?

A. $3y^2 + 4x$

B. $3y^2 + 2x$

C. $2x^2 + 3y$

D. $4x^2 + 2y$

Answer: B



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14. The number of bacteria in a culture is x now. It becomes square of itself after one week. What will be its number after two weeks?

A. $2x + 1$

B. $3x + 2$

C. $2x + 2$

D. $2x + 3$

Answer: C

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15. The area of a rectangle is given by the product of its length and breadth. the length of a rectangle is two-third of its breadth. Find its area if its breadth is x cm.

A. $\frac{3x^2}{2} \text{ cm}^2$

B. $\frac{2x^2}{3} \text{ cm}^2$

C. $\frac{3x^2}{4} \text{ cm}^2$

D. $\frac{4x^2}{3} \text{ cm}^2$

Answer: B

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16. If there are x rows of chairs and each row contains $3x$ chairs. Determine the total number of chairs.

A. $3x^2$

B. $2x^3$

C. x^2

D. x^3

Answer: A



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17. Subtract : $\frac{3}{2}x^2y + \frac{4}{5}y - \frac{1}{3}x^2yz$ from $\frac{12}{5}x^2yz - \frac{3}{5}xyz + \frac{2}{3}x^2y$.

A. $\frac{41}{15}x^2yz - \frac{5}{6}x^2y - \frac{3}{5}xyz - \frac{4}{5}y$

B. $\frac{5}{6}x^2yz - \frac{3}{5}x^2y + \frac{41}{15}x^2yz - \frac{4}{5}y$

C. $\frac{4}{5}x^2yz - \frac{5}{6}x^2y - \frac{3}{4}xyz + \frac{4}{7}y$

D. $\frac{41}{15}x^2yz + \frac{5}{6}x^2y + \frac{4}{5}xyz + \frac{3}{5}y$

Answer: A

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18. Take away $\frac{9}{2} + \frac{x}{2} + \frac{3}{5}x^2 + \frac{7}{4}x^3$ from $\frac{7}{2} - \frac{x}{3} - \frac{x^2}{5}$.

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

B. $\frac{4}{5}x^3 + \frac{3}{4}x^2 + \frac{2}{5}x + 1$

C. $-\frac{7}{4}x^3 - \frac{4}{5}x^2 - \frac{5}{6}x - 1$

D. $\frac{7}{4}x^3 - \frac{3}{4}x^2 + \frac{2}{7}x + 1$

Answer: C

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19. Add the following algebraic expressions and then find value at $y=1$

$$\frac{2y}{3} - \frac{5y^2}{3} + \frac{5y^3}{2}, \quad -\frac{4}{3} + \frac{2y^2}{3} - \frac{y}{2}$$

A. $\frac{1}{3}$

B. $\frac{-3}{7}$

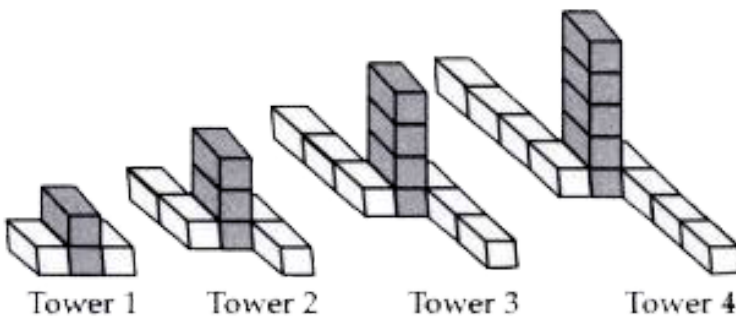
C. $\frac{3}{2}$

D. $\frac{4}{3}$

Answer: A

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20. A series of towers consist of cuboids of same size as shown below. The shaded cuboids represent the vertical height of each tower.



Find the number of cuboids needed to form the vertical height of Tower 2345.

A. 2348

B. 2344

C. 2346

D. 2345

Answer: C

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21. The score of Ishita in Mathematics is 25 more than the two third of her score in Science. If she scored x marks in Science, determine her score in Mathematics.

A. $\frac{3}{2}x + 25$

B. $\frac{2}{3} + 25x$

C. $\frac{2}{3}x + 25$

D. $\frac{3}{2} + 25x$

Answer: C

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22. John covers x centimetres in one step. How many centimetres does he cover in 9 steps?

A. $\frac{x}{9}$

B. $9x$

C. $18x$

D. $x + 9$

Answer: B

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23. Simplify : $4s^2t - 5st^2 - 7s^2t - 3s^2t^2 + 3st^2 + 3s^2t - (-2st^2)$

A. 0

B. $-3st^2$

C. $3s^2t$

D. $-3s^2t^2$

Answer: D

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24. Simplify :

$$a^3b - a^2b^3 + 4a^2b^3 - 2a^3b^2 - a^3b + 2a^3b^2$$

A. $3a^2b^3$

B. $-3a^3b$

C. $-3a^3b^2$

D. 0

Answer: A

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25. Subtract $(2a - 3b + 4c)$ from the sum of $(a + 3b - 4c)$, $(4a - b + 9c)$ and $(-2b + 3c - a)$

A. $3a + 2b + 4c$

B. $2a - 2b + 4c$

C. $3a - 4b - 2c$

D. $2a + 3b + 4c$

Answer: D

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26. If $a = 1$ and $b = (-3)$, the value of $4a^3b^2 - 3a^2b + 4ab^2 - ab$ is

A. -84

B. 84

C. -108

D. -72

Answer: B



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27. From the sum of $5a^2b - 7ab + 10$ and $-3a^2b + 3ab - 4$, subtract $6ab + 15$.

A. $2a^2b + 2ab - 9$

B. $2a^2b - 4ab + 6$

C. $2a^2b - 10ab - 9$

D. $5a^2b - 2ab - 9$

Answer: C



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28. How much larger is $13x^2 - 7y^2$ than $6x^2 - 9y^2$?

A. $7x^2 - 2y^2$

B. $7x^2 + 2y^2$

C. $6x^2 - 3y^2$

D. $6x^2 + 3y^2$

Answer: B



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29. A pipe is $(7x - 3)$ metres long. A length of $(5x - 7)$ metres is cut for use.

How much pipe (in metres) is left?

A. $2x + 4$

B. $-2x + 7$

C. $3x + 2$

D. $2x + 1$

Answer: A



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30. If $x = 3$, and $y = 4$, find the value of $y^3x^2 + 7x^2y^2 - 3xy + 7$.

A. 461

B. 1627

C. 1555

D. 389

Answer: C



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31. The sum of $x^3 + x^2 - 2x$, $5x - 2x^2 + 7x^3$ and $8x^2 - 10x + 10x^3$ is

A. $18x^3 + 7x^2 - 7x$

B. $11x^3 - 10x^2 - 5x$

C. $18x^3 - 13x^2 - 7x$

D. $10x^3 - 11x^2 - 5x$

Answer: A

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32. The coefficient of y^2 in $-63x^3y^2z$ is

A. -63

B. $-63z$

C. $63x^3z$

D. $-63y^2$

Answer: C

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33. Subtract $3y^2 - 2xy - \frac{7}{2}x^2$ from $-\frac{2}{3}y^2 - \frac{3}{2}xy + 4x^2$.

A. $\frac{11}{3}y^2 - \frac{1}{2}xy - \frac{11}{2}x^2$

B. $\frac{11}{3}y^2 + \frac{7}{2}xy + \frac{11}{2}x^2$

C. $-\frac{11}{3}y^2 + \frac{1}{2}xy + \frac{15}{2}x^2$

D. $-\frac{11}{3}y^2 + \frac{7}{2}xy + \frac{15}{2}x^2$

Answer: C

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34. The length of rectangle is $(7x - 3y)$ units and its breadth is $(3x + 4y)$ units.

The perimeter of the rectangle is

A. $(13x + 5y)$ units

B. $(17x - 2y)$ units

C. $(20x + 2y)$ units

D. $(10x + y)$ units

Answer: C



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35. The value of m , if the value of $3x^2 + x - m$ is equal to 7, when $x = -1$ is

A. -5

B. 8

C. -7

D. 12

Answer: A



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Exercise Multiple Choice Question Level 2

1. Tanmay had Rs. 56. He spent Rs x on transport and Rs $2y$ on lunch. He spent the remaining amount to buy 3 similar books. What was the cost of the each book?

A. Rs $(56 - x + 2y)$

B. Rs $(56 - x - 2y)$

C. Rs $\frac{56 - x + 2y}{3}$

D. Rs $\frac{56 - x - 2y}{3}$

Answer: D



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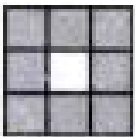


Figure 1

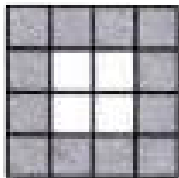


Figure 2

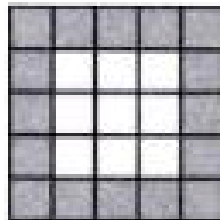


Figure 3

2.

Based upon the pattern above, how many unshaded squares will Figure 9

have?

A. 100

B. 49

C. 64

D. 81

Answer: D



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3. Rohan spends Rs x daily and saves Rs y per week. What is his income after 3 weeks?

A. Rs $(21x + 3y)$

B. Rs $(23x + 9y)$

C. Rs $(21x + 9y)$

D. Rs $(7x + 3y)$

Answer: A



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4. Ahmed starts from Delhi at 8 AM to Jaipur. If his car is running at the speed of $x \text{ km/hr}$ and at 1PM he observes that he is 20km away from Jaipur. Find the distance between Delhi and Jaipur.

A. $(4x + 20)$ km

B. $(4x + 25)$ km

C. $(5x + 25)$ km

D. $(5x + 20)$ km

Answer: D



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5. Subtract the sum of $(8m + 7n + 6p^2)$ and $(-3m - 4n - p^2)$ from the sum of $(2m + 4n - 3p^2)$ and $(-m - n - p^2)$.

A. $4m + 9p^2$

B. $4m - 6n + 9p^2$

C. $-4m + 6n - 9p^2$

D. $4m - 9p^2$

Answer: A



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6. The perimeter of a triangle is $(7x - 15)$ cm. The two sides are $(3x - 3)$ cm and $(2x - 2)$ cm. Find the third side.

A. $3x - 13$

B. $2x - 10$

C. $2x - 15$

D. $3x - 15$

Answer: B



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7. If $A = 19x^2 - x + 6$, $B = x^2 - x$, $C = 4x - 1$, find $A - B + C$.

A. $17x^2 - 5x + 7$

B. $18x^2 + 4x - 5$

C. $24x^2 - 4x + 7$

D. $18x^2 + 4x + 5$

Answer: D



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8. Distance covered by a man 3 times around a square park having side $3x - 2a + 5$ is

A. $9x - 6a + 15$

B. $12x - 4a + 20$

C. $36x - 24a + 60$

D. None of these

Answer: C



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9. If $P = m^2 - n^2$, $Q = n + m$, $R = 2m + 2n + m^2$, then $P + 2Q - R$ is equal to

A. m^2

B. $-m^2$

C. n^2

D. $-n^2$

Answer: D

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10. The H.C.F. of $14x^3y^2$ and $21y^3z^2$ is

A. $7xyz$

B. $7x^2y$

C. $7y^2$

D. xyz

Answer: C

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11. Somya bought 2 toy cars for Rs $(4x + 3y)$ each and 1 book for Rs $(7x - 3y)$.

What is the total money spent by her?

A. $11x + 6y$

B. $15x + 3y$

C. $3x - 6y$

D. $3x + 6y$

Answer: B



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12. Simplify the expression : $5m^2n^2 - 3n^2 + 6m^2 - (9n^2 + 2m^2n^2)$ and

find its value when $m = -2$ and $n = 4$.

A. 192

B. 96

C. 240

Answer: D[Watch Video Solution](#)

13. Sameeksha had Rs $(58x^2 + 6x - 3)$ with her. She spent Rs $(19x^2 - 2x - 1)$ out of it. What amount (in Rs) is left with her?

A. $45x^2 + 4x - 2$

B. $39x^2 + 8x - 2$

C. $77x^2 + 4x - 4$

D. $39x^2 + 4x - 2$

Answer: B[Watch Video Solution](#)

14. The base of an isosceles triangle is $3a - 2$ units and the two equal sides in $5a + 3$ units. The perimeter of the triangle is

- A. $11a - 1$ units
- B. $8a + 1$ units
- C. $13a + 4$ units
- D. $4a - 5$ units

Answer: C



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15. The sum of $8x^2y^2z^3$, $12x^2z^3y^2$ and $15x^2y^2z^3$ is

- A. $24x^3y^2z^3$
- B. $360x^3y^4z^3$
- C. $180x^3y^3z^3$
- D. $35x^2y^2z^3$

Answer: D

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Exercise Matching

1. Match the following:

List-I

- (P) Add $x^5 + 8x^3 - 7x^2 + 12$
and $-3x^3 + 10x^2 + 8$
- (Q) Subtract $2x^2y + 4x^2y^2 + 3xy^2$
from $5x^2y + 7xy^2$
- (R) Subtract $2x^3 + 2x^2 - 4x - 4$
from $x^3 - x^2 - x - 2$
- (S) Add $x^3 - x^2 - x - 2$
and $2x^2 - 2x^3 + 4x - 4$

List-II

- (1) $-x^3 - 3x^2 + 3x + 2$
- (2) $-x^3 + x^2 + 3x - 6$
- (3) $x^5 + 5x^3 + 3x^2 + 20$
- (4) $3x^2y + 4xy^2 - 4x^2y^2$

- A. P-3, Q-2, R-1, S-4
- B. P-2, Q-4, R-1, S-2
- C. P-2, Q-4, R-3, S-1

D. P-2, Q-3, R-4, S-1

Answer: B



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2. Match the value of given expressions.

List-I

List-II

(P) $(x^2 + 5)(x^3 + 3) + 5$
at $x = 2$

(1) 0

(Q) $2x^3 + 2x^2 - 4x - 4$
at $x = -2$

(2) 104

(R) $\left(\frac{-10}{3}xy^3\right) \times \left(\frac{6}{5}x^3y\right)$
at $x = 5, y = 3$

(3) 13

(S) $x^3 - x^2 - x - 2$
at $x = 3$

(4) -4

A. P-3, Q-2, R-4, S-1

B. P-2, Q-3, R-1, S-4

C. P-2, Q-4, R-1, S-3

D. P-3, Q-1, R-4, S-2

Answer: C



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Exercise Assertion And Reason

1. Assertion : $10pq^2 - 7q^2 2pq - 4q^2 p^2 + 3$ is an algebraic expression.

Reason : Algebraic expressions are formed from variables and constants. We use the operations of addition, subtraction, multiplication and division on the variables and constants to form expressions.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true and reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer: A



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2. Assertion : In algebraic expression $2y^2 + 3yz - y^2 - yz + z^2 - xyz$, $2y^2$, $3yz$, y^2 , yz , z^2 and xyz are terms of expression.

Reason : Expressions are made up of terms. Terms are added to make an expression.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true and reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

Answer: D

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3. Assertion : In $10xy, -7y, -8x, x^2y^2, 100y^2, -12x^2y^2, 5x^2, 3y$ like terms are $-7y$ and $3y, x^2y^2$ and $-12x^2y^2$.

Reason : Terms which have the same algebraic factors are like terms.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true and reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

Answer: A

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4. The value of $19x - 5x^2$ for $x = -2$ is



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5. Assertion : Expression $xy - x - y + 4$ is a polynomial.

Reason : Any expression with one or more terms is called a monomial.

- A. If both assertion and reason are true and reason is the correct explanation of assertion.
- B. If both assertion and reason are true and reason is not the correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

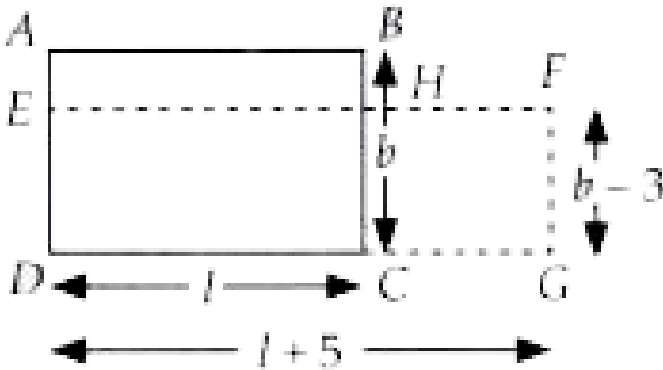
Answer: C



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Exercise Comprehension Passage I

1. We have a rectangle of length l and breath b . The length of the rectangle is increased by 5 units, i.e., $(l+5)$ units and breath is decreased by 3 units, i.e., $(b - 3)$ units.



From above answer the following questions :

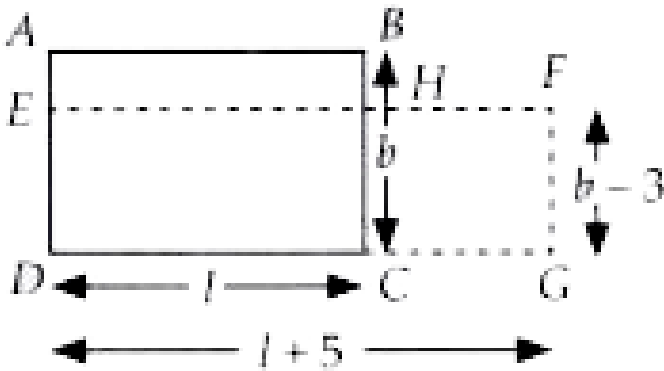
What is the perimeter of rectangle DEHC?

- A. $(3l + 2b + 6)$ units
- B. $(2l + 2b - 6)$ units
- C. $(3l - 2b - 6)$ units
- D. $(2l - 3b - 15)$ units

Answer: B

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2. We have a rectangle of length l and breath b . The length of the rectangle is increased by 5 units, i.e., $(l+5)$ units and breath is decreased by 3 units, i.e., $(b - 3)$ units.



From above answer the following questions :

If length of rectangle DEFG is 2 times its breath then find the perimeter of the rectangle DEFG.

A. $(6b + 16)$ units

B. $(2b + 18)$ units

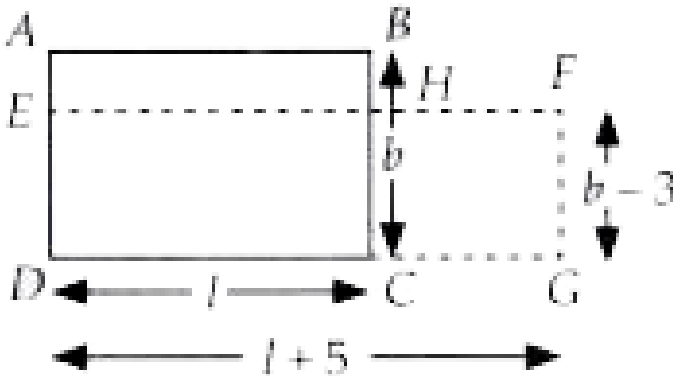
C. $(6b - 18)$ units

D. $(6l + 16)$ units

Answer: C

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3. We have a rectangle of length l and breath b . The length of the rectangle is increased by 5 units, i.e., $(l+5)$ units and breath is decreased by 3 units, i.e., $(b - 3)$ units.



From above answer the following questions :

What is the perimeter of rectangle DEFG?

A. $(2l + 2b + 4)$ units

B. $(2l + 2b)$ units

C. $(2l + 4b - 2)$ units

D. $(2b + 4l + 2)$ units

Answer: A

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Exercise Comprehension Passage li

1. If $a * b$ means a is added to b , and if $a = x^2 + x + 1$ and $b = 2x^2 - 4x + 6y$, find $a * 3b$.

A. $11x^2 - 7y + 19x - 1$

B. $7x^2 - 11x + 7y + 18$

C. $18x^2 - 7x + 11y + 1$

D. $7x^2 - 11x + 18y + 1$

Answer: D

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2. If $a * b$ means a is added to b ,

$a \$ b$ means b is subtracted from a .

$a \# b$ means a is multiplied by b .

$a \& b$ means a is divided by b ,

then answer the following questions :

If $a = \frac{x}{2} + \frac{3y}{4}$ and $b = \frac{-x}{2} + \frac{6y}{4}$, then find $a \$ b * a$.

A. $\frac{1}{2}x$

B. $\frac{3}{2}x$

C. $\frac{3}{4}y$

D. $\frac{3}{8}y$

Answer: B

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3. If $a*b$ means a is added to b ,

$a \$ b$ means b is subtracted from a .

$a \# b$ means a is multiplied by b .

$a \& b$ means a is divided by b ,

then answer the following questions :

If $a = 4x - 7xy + 3y + 12$ and $b = 12x - 9xy + 6y - 3$, then find $a \$ b$

3.

A. $-32x + 20xy - 15y + 21$

B. $32x + 4xy - y - 12$

C. $-32x - xy + 13$

D. $-3xy + x + 12$

Answer: A



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1. Find the coefficient of xy in the expression $2x^2y + 4xy - 3yx$.

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2. Name the polynomial $4x^2 + x - 1$.

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3. Are the terms $\frac{2}{5}x^2y$, $-\frac{3}{2}x^2y$ and $\frac{10}{7}x^2y$ like terms?

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4. How many terms are there in a binomial?

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5. Is $7x^2 - 9x - 3(-3x^2 - 3x + 2)$ a monomial or a binomial?

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6. What is the difference between binomial and monomial?

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7. What is the coefficient of $y \times (-3x^2)$?

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8. What is the constant term in the sum of $(5x^2 - 7x + 4)$ and $(7x - 8)$?

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9. If $a = 2$, $b = -1$, then find the value of $a^2 + b^2 + 2ab$



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10. If $A = 3x^2 + 2x - 7$ and $B = 7x^3 - 3x + 4$, then find :

$$2A + 3B$$



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Exercise Short Answer Type

1. Simplify : $3(4x^2 - 5x) + 4(3x^2 + 5x)$ and find the value for

$$x = 3$$



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2. Simplify : $3(4x^2 - 5x) + 4(3x^2 + 5x)$ and find the value for

$$x = \frac{1}{2}$$



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3. Subtract $4(-ac + 4bc + c^2)$ from $3(a^2 + ab + ac) - 5(ab - b^2 + bc)$.

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4. Solve : simplify $\frac{4}{3}m^2 - \frac{3}{4}n^2 + 2mn - \left(\frac{16}{9}m^2 + \frac{9}{16}n^2 + 2mn\right)$.

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5. Subtract $4p^2q + pq^2 - 3pq + 7q - 8p - 10$ from $5p^2q - 2pq^2 + 5pq - 11q - 3p + 28$.

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6. Simplify : $4(a^3 + a^2 + a) - (5a + 3)$ and find its value for

$a = 0$

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7. Simplify : $4(a^3 + a^2 + a) - (5a + 3)$ and find its value for

$$a = 1$$

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8. The length and breath of a rectangle are $(6x^2 - 2)$ units and $(5x + 2)$ units respectively. Find its perimeter.

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9. Show that : $(4pq + 3q) - (4pq - 3q) = 6q$

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10. Simplify : $(15x - 4y) + (15x + 4y + 3) - 45x + 12y$.

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11. Simplify : $(a + 2b) + (a - 4b + 6c) - (5a - 3b)$.

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12. Subtract :

$4x^2 - 3x + 4$ from $8x^2 - 5x - 8$

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13. Subtract :

$2x - 3y + 4z$ from $10x + 4y - 8z$.

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Exercise Long Answer Type

1. Find the product of $\frac{7}{2}s^2t$ and $s + t$. Verify the result for $s = \frac{1}{2}$ and $t = 5$.

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2. Add the following algebraic expressions:

$$2, \frac{2y}{3} - \frac{5y^2}{3} + \frac{5y^3}{2}, -\frac{4}{3} + \frac{2y^2}{3} - \frac{y}{2}, \frac{5y^3}{3} + 3y^2 + 3y + \frac{6}{5}$$

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3. Simplify : $9x^4 + (2x^3 - 5x^4) - 5x^3 - (x^4 - 3x^2)$ and find its value for $x = -2$.

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4. Simplify : $(2x + 3y) - (3x + 4y) + (7x + 3y) + (x + 2y)$ and find value for $x = 2, y = 1$.

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5. Find the sum of $24(x^2 - 2x^3)$ and $-3(xy^2 + y^3)$ and evaluate their sum at $x = \frac{1}{2}$ and $y = 2$.

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Exercise Integer Numerical Value Type

1. Find the value of expression $(4x - 3y)(4x + 3y + 5) - 4x + 12y$ when $x = 2$ and $y = 3$.

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2. Find the value of $\left(\frac{-8}{5}a^2b^2c^3\right) \times \left(\frac{-3}{4}ab^2c\right)$ at $a = \frac{1}{5}$, $b = -\frac{1}{2}$ and $c = 5$.

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3. Find the value of expression $6x^3(2x^2 - 1)$ at $x = 2$.

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4. How many terms are there in $3x - \frac{4}{5}xy^2 - \frac{1}{5}xy^2 - \frac{2}{3}y$?

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5. Subtract $(2x^2 - 5x + 7)$ from $(3x^2 + 4x - 6)$

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6. If the sum of $(8x^2 - 6x + 9)$ and $(-10x^2 - 8x - 9)$ is subtracted from -3 , then find the coefficient of x .

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7. Find the constant term on subtracting

$-17x^2 + (3x - 7)$ from $2x^2 + (3x - 4x^2)$.

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8. Find the value of $a^2 + ab^2 + a^2b + b^2$ at $a = -1$ and $b = 2$.

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9. Find the products

$$\left(\frac{-7}{5}x^2y\right) \times \left(\frac{3}{2}xy^2\right) \times \left(\frac{-6}{5}x^3y^3\right)$$

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10. The sum of the values of the expression $2x^2 - 2x + 2$ when $x = -1$ and $x = 1$ is _____.

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1. Find the cost of 3 notebooks and 1 magazine in terms of y , if the cost of 1 notebook is Rs $2y$ and that of 1 magazine is Rs $(y + 3)$.

A. Rs $(3y + 3)$

B. Rs $(6y + 3)$

C. Rs $(7y + 3)$

D. Rs $(8y + 3)$

Answer: C

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2. Find the value of $\frac{3c^3}{8} - 21$, when $c = -2$.

A. -24

B. 72

C. 29

D. 35

Answer: A



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3. Find the value of expression

$$(x - 6) - (x - 5) + 40 - 17(x - 2) \text{ at } x = \frac{1}{17}$$

A. 73

B. -4

C. 75

D. 72

Answer: D



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4. Simplify the given expression and find its value at

$$x = -44: 2(x - 4) - (x + 4) + 54 + (x - 5) - (x - 10).$$

A. 4

B. 8

C. -8

D. 3

Answer: D

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5. The perimeter of a triangle is $5 - 3a + 7a^2$ and two of its sides are

$$2a^2 + 3a - 2 \quad \text{and} \quad 3a^2 - a + 3.$$

Find the third side of the triangle.

A. $4 - 5a + 2a^2$

B. $-4 + 5a - 2a^2$

C. $4 + 5a + 2a^2$

D. $5 - 4a - 2a^2$

Answer: A



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6. By how much is $-12x + 2y$ greater than the sum of $-18x + 6y$ and $5x - 25y$?

A. $x + 21y$

B. $-x - 21y$

C. $x + 25y$

D. $x + 36y$

Answer: A



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7.

If

$$A = 9t^2 + 14xt - 3x^2, B = 16xt + 4x^2 - 5t^2 \text{ and } C = -7x^2 - 19xt - 8t^2$$

, Then find the value of $B - A - C$.

A. $-6t^2 + 21xt + 14x^2$

B. $6t^2 - 21xt - 14x^2$

C. $14x^2 + 15xt - 3t^2$

D. $17x^2 + 21xt + 19t^2$

Answer: A[Watch Video Solution](#)

8. Read the following statements carefully and select the correct option.

Statement-1 : Difference between the value of expression,

$4x + 2(x + y)$ when $x + 2, y = 3$ and when $x + 3, y + 2$ is 10.

Statement-2 , $4(a + 2b) + 3b^2 + 9ab$ should be subtracted from

$2a - 2b + b^2 - 6ab$ to get $-(2a + 10b + 8b^2 + 5ab)$.

A. Statement-1 is true but Statement-2 is false.

B. Statement-1 is false but Statement-2 is true.

C. Both Statement-1 and Statement-2 are true.

D. Both Statement-1 and Statement-2 are false.

Answer: D

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9. Find the sum of $4x^3 - 3x^2 + 2x - 5$ and $-7x^3 + 6x^2 - x + 11$.

A. $3x^3 - 3x^2 + x + 6$

B. $-3x^3 + 3x^2 + x + 6$

C. $3x^3 + 3x^2 - x - 6$

D. $3x^3 - 3x^2 - x + 6$

Answer: B

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10. The cost of a book is Rs $(8p + 4q)$ cost of a note book is Rs $(5p - 2q)$ and cost of a pen is Rs $(2p - 2q)$. What is the total cost (in Rs) of all three items?

A. $15q$

B. $15p + 2q$

C. $15p$

D. $15p - 2q$

Answer: C



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