MATHS

BOOKS - ICSE

ALGEBRAIC EXPRESSIONS

Example

1. Add : 6- 3a + b , a - 7-6b and 3b + 2- a.

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2. Subtract : $5x - 3x^2 + 8xy$ from $7x^2 + 3xy - 4x$.

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3. Subtract $12x + 3y - z$ from the sum of $7x + 4y - 5z + 5$ and $6x - 7z - 8$.

4. Take away $8x - 7y + 8p + 10q$ from $10x + 12y - 7p + 9q$.

5. If a = 3x - 5y, b = 6x + 3y and c = 2y - 4x. $F \in d : (i)$a + b - c, (ii)2a - 3b + 4c`.

6. The perimeter of a tringle is $15x^2 - 23x + 9$ and two of its sides are $5x^2 - 8x - 1$ and $6x^2 - 9x + 4$. Find the side.

A. $4x^2 - 22x - 6$

B. $4x^2 + 22x + 6$

C. $4x^2 - 22x + 6$

D. $4x^2 + 22x - 6$

Answer: C

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7. Multiply $6a^2b^3$ and $-4a^3b^4$.

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8. Multiply $8a^2b - 3ab + 5b^2$ by 6ab.

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9. Multiply $x^2 - 4x + 7$ by x - 2.

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10. Multiply $2x^3 - 7x + 8$ by $3x^2 + 2x$.

11. The adjacent sides of a rectangle are $3x^2 - 2xy + 5y^2$ and $2x^2 + 5xy - 3y^2$. Find the area of the rectangle.

12. Multiply $3x^2y$ and $-2xy^2$. Verify the product for x = 1 and y = 2.

13. Multiply $-5xy^2$, $-3x^2yz$ and $8yz^2$. Verify the result for x = 1, y = 2 and z = 3.

14. Divide :

$36a^7$ by $-12a^3$

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15. Divide :

$-50a^2b^3$ by $-15a^4b^2$

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16. Divide : $9a^5 - 6a^2$ by $3a^2$

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17. Divide : $8x^2 - 45y^2 + 18xy$ by 2x - 3y.

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18. Find the quotient and the remainder (if any), when, $2x^3 - 8x^2 + 5x - 8$ is divided by x - 2.

19. Simplify : $84 - 7[-11x - 4\{-17x + 3(8 - 9 + 5x))\}]$

20. Simplify :

$x^5 \div x^7 \times x^4$

21. Simplify :

$x^5 \div x^7 \times x^4$

22. Simplify :

$$5y \times \left[6y \div 3 + \left\{4 - \left(3y - \overline{2y - 4}\right)\right\}\right]$$

Exercise 11 A

1. Separate the constants and variables from the following :

$$-7, 7 + x, 7x + yz, \sqrt{5}, \sqrt{xy}, \frac{3yz}{8}, 4.5y - 3x, 8 - 5, 8 - 5x, 8x - 5y \times p$$

and $3y^2 z \div 4x$

2. Write the number of terms in each of the following polynomials :

$$5x^2 + 3 \times ax$$

3. Write the number of terms in each of the following polynomials :

$ax \div 4 - 7$

4. Write the number of terms in each of the following polynomials :

$ax - by + y \times z$

5. Write the number of terms in given polynomial :

$23 + a \times b \div 2$

6. Separate monomials, binomials, trinomials and polynomials from the following algebraic expressions :

$8 - 3x,\ xy^2,\ 3y^2 - 5y + 8,\ 9x - 3x^2 + 15x^3 - 7,\ 3x \times 5y,\ 3x \div 5y,\ 2y \div 7$

and $4 - ax^2 + bx + y$

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7. Write the degree of each polynomials given below :

$xy + 7z$

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8. Write the degree of each polynomials given below :

$x^2 - 6x^3 + 8$

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9. Write the degree of each polynomials given below :

$$y - 6y^2 + 5y^8$$

A. 8

B. 2

C. 7

D. 11

Answer: A

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10. Write the degree of each polynomials given below :

$$xyz - 3$$

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11. Write the degree of each polynomials given below :

$$xy + yz^2 - zx^3$$

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12. Write the degree of each polynomials given below :

$$x^5y^7 - 8x^3y^8 + 10x^4y^4z^4$$

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13. Write the coefficient of :

ab in 7abx

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14. Write the coefficient of :

7a in 7abx

15. Write the coefficient of :

$5x^2$ in $5x^2 - 5x$

16. Write the coefficient of :

8 in $a^2 - 8ax + a$

17. Write the coefficient of :

$4xy$ in $x^2 - 4xy + y^2$

18. In $\frac{5}{7}xy^2z^3$, write the coefficient of :

5

19. In $\frac{5}{7}xy^2z^3$, write the coefficient of :

$\frac{5}{7}$

20. In $\frac{5}{7}xy^2z^3$, write the coefficient of :

5x

21. In $\frac{5}{7}xy^2z^3$, write the coefficient of :

xy^2

22. In $\dfrac{5}{7}xy^2z^3$, write the coefficient of :

z^3

23. In $\dfrac{5}{7}xy^2z^3$, write the coefficient of :

xz^3

24. In $\dfrac{5}{7}xy^2z^3$, write the coefficient of :

$5xy^2$

25. In $\dfrac{5}{7}xy^2z^3$, write the coefficient of :

$\dfrac{1}{7}yz$

26. In $\dfrac{5}{7}xy^2z^3$, write the coefficient of :

z

A. $\dfrac{5}{7}$

B. $\dfrac{5}{7}xy^2z^3$

C. $\dfrac{5}{7}xy^2$

D. $\dfrac{5}{7}xy^2z^2$

Answer: D

27. In $\frac{5}{7}xy^2z^3$, write the coefficient of :

yz^2

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28. In $\frac{5}{7}xy^2z^3$, write the coefficient of :

5xyz

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29. In each polynomial, given below, separate the like terms :

$3xy - 4yx^2, 2xy^2, 2.5x^2y, 8yx, -3.2y^2x$ and x^2y

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30. In each polynomial, given below, separate the like terms :

$y^2z^3, xy^2z^3, -5x^2yz, -4y^2z^3, -8xz^3y^2, 3x^2yz$ and $2z^3y^2$

Exercise 11 B

1. Evaluate :

$$-7x^2 + 18x^2 + 3x^2 - 5x^2$$

2. Evaluate :

$$b^2y - 9b^2y + 2b^2y - 5b^2y$$

3. Evaluate :

$$abx - 15abx - 10abx + 32abx$$

4. Evaluate :

$$7x - 9y + 3 - 3x - 5y + 8$$

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5. Evaluate :

$$3x^2 + 5xy - 4y^2 + x^2 - 8xy - 5y^2$$

A. $4x^2 + 3xy - 9y^2$

B. $4x^2 - 3xy - 9y^2$

C. $4x^2 - 3xy + 9y^2$

D. $4x^2 + 3xy + 9y^2$

Answer: B

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6. Add :

$5a + 3b, \; a - 2b, \; 3a + 5b$

7. Add :

$8x - 3y + 7z, \; -4x + 5y - 4z, \; -x - y - 2z$

8. Add :

$3b - 7c + 10, \; 5c - 2b - 15, \; 15 + 12c + b$

9. Add :

$a - 3b + 3, \; 2a + 5 - 3c, \; 6c - 15 + 6b$

10. Add :

$$13ab - 9cd - xy, 5xy, 15cd - 7ab, 6xy - 3cd$$

11. Add :

$$x^3 - x^2y + 5xy^2 + y^3, \; -x^3 - 9xy^2 + y^3, 3x^2y + 9xy^2$$

12. Find the total savings of a boy who saves Rs. (4x - 6y), Rs (6x + 2y), Rs. (4y - x) and Rs (y-2x) in four consecutive weeks.

13. Subtract :

$4xy^2$ from $3xy^2$

14. Subtract :

$-2x^2y + 3xy^2$ from $8x^2y$

15. Subtract :

$3a - 5b + c + 2d$ from $7a - 3b + c - 2d$

16. Subtract :

$x^3 - 4x - 1$ from $3x^3 - x^2 + 6$

17. Subtract :

$6a + 3$ from $a^3 - 3a^2 + 4a + 1$

18. Subtract :

$cab - 4cad - cbd$ from $3abc + 5bcd - cda$

19. Subtract :

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

20. Take away $-3x^3 + 4x^2 - 5x + 6$ from $3x^3 - 4x^2 + 5x - 6$

21. Take $m^2 + m + 4$ from $-m^2 + 3m + 6$ and the result from $m^2 + m + 1$.

22. Subtract the sum of $5y^2 + y - 3$ and $y^2 - 3y + 7$ from $6y^2 + y - 2$.

23. What must be added to $x^4 - x^3 + x^2 + x + 3$ to obtain $x^4 + x^2 - 1$?

24. How much more than $2x^2 + 4xy + 2y^2$ is $5x^2 + 10xy - y^2$?

25. How much less $2a^2 + 1$ is than $3a^2 - 6$?

26. If x = 6a + 8b + 9c, y = 2b - 3a - 6c and z = c - b + 3a, find :

$x + y + z$

27. If x = 6a + 8b + 9c, y = 2b - 3a - 6c and z = c - b + 3a, find :

$x - y + z$

28. If x = 6a + 8b + 9c, y = 2b - 3a - 6c and z = c - b + 3a, find :

$$2x - y - 3z$$

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29. If x = 6a + 8b + 9c, y = 2b - 3a - 6c and z = c - b + 3a, find :

$$3y - 2z - 5x$$

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30. The sides of a triangle are $x^2 - 3xy + 8, 4x^2 + 5xy - 3$ and $6 - 3x^2 + 4xy$. Find its perimeter.

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31. The perimeter of a triangle is $8y^2 - 9y + 4$ and its two sides are $3y^2 - 5y$ and $4y^2 + 12$. Find its third side.

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32. The two adjacent sides of a rectangle are $2x^2 - 5xy + 3z^2$ and $4xy - x^2 - z^2$. Find its perimeter.

33. What must be subtracted from $19x^4 + 2x^3 + 30x - 37$ to get $8x^4 + 22x^3 - 7x - 60$?

34. How much smaller is $15x - 18y + 19z$ than $22x - 20y - 13z + 26$?

35. How much bigger is $5x^2y^2 - 18xy^2 - 10x^2y$ than $-5x^2 + 6x^2y - 7xy$?

Exercise 11 C

1. Multiply :

$8ab^2$ by $-4a^3b^4$

2. Multiply :

$\dfrac{2}{3}ab$ by $-\dfrac{1}{4}a^2b$

3. Multiply :

$-5cd^2$ by $-5cd^2$

4. Multiply :

4a and 6a + 7

5. Multiply :

$-8x$ and $4 - 2x - x^2$

6. Multiply :

$2a^2 - 5a - 4$ and $-3a$

7. Multiply :

$x + 4$ by x - 5

8. Multiply :

$5a - 1$ by 7a - 3

9. Multiply :

$12a + 5b$ by $7a - b$

10. Multiply :

$x^2 + x + 1$ by $1 - x$

11. Multiply :

$2m^2 - 3m - 1$ and $4m^2 - m - 1$

12. Multiply :

a^2, ab and b^2

13. Multiply :

abx, $-3a^2x$ and $7b^2x^3$

14. Multiply :

$-3bx$, $-5xy$ and $-7b^3y^2$

15. Multiply :

$-\dfrac{3}{2}x^5y^3$ and $\dfrac{4}{9}a^2x^3y$

16. Multiply :

$-\dfrac{2}{3}a^7b^2$ and $-\dfrac{9}{4}ab^5$

17. Multiply :

$2a^3 - 3a^2b$ and $-\dfrac{1}{2}ab^2$

18. Multiply :

$2x + \dfrac{1}{2}y$ and $2x - \dfrac{1}{2}y$

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19. Multiply :

$5x^2 - 8xy + 6y^2 - 3$ by $-3xy$

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20. Multiply :

$3 - \dfrac{2}{3}xy + \dfrac{5}{7}xy^2 - \dfrac{16}{21}x^2y$ by $-21x^2y^2$

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21. Multiply :

$6x^3 - 5x + 10$ by $4 - 3x^2$

22. Multiply :

$2y - 4y^3 + 6y^5$ by $y^2 + y - 3$

23. Multiply :

$5p^2 + 25pq + 4q^2$ by $2p^2 - 2pq + 3q^2$

24. Simplify :

$(7x - 8)(3x + 2)$

25. Simplify :

(px - q)(px + q)

26. Simplify :

(5a + 5b - c)(2b - 3c)

27. Simplify :

(4x - 5y)(5x - 4y)

28. Simplify :

$$(3y + 4z)(3y - 4z) + (2y + 7z)(y + z)$$

29. The adjacent sides of a rectangle are $x^2 - 4xy + 7y^2$ and $x^3 - 5xy^2$. Find its area.

30. The base and the altitude of a triangle are $(3x - 4y)$ and $(6x + 5y)$ respectively. Find its area.

31. Multiply $-4xy^3$ and $6x^2y$ and verify your result for x = 2 and y = 1.

32. Find the value of $(3x^3) \times (-5xy^2) \times (2x^2yz^3)$ for x = 1, y = 2 and z = 3.

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33. Evaluate $(3x^4y^2)(2x^2y^3)$ for x = 1 and y = 2.

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34. Evaluate $(x^5) \times (3x^2) \times (-2x)$ for x = 1.

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35. If x = 2 and y = 1,

Find the value of $(-4x^2y^3) \times (-5x^2y^5)$.

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36. Evaluate :

$(3x - 2)(x + 5)$ for x = 2.

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37. Evaluate :

$(2x - 5y)(2x + 3y)$ for x = 2 and y = 3.

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38. Evaluate :

$xz(x^2 + y^2)$ for x = 2, y = 1 and z = 1.

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39. Evaluate :

$x(x - 5) + 2$ for x = 1.

40. Evaluate :

$xy^2(x - 5y) + 1$ for x = 2 and y= 1.

41. Evaluate :

$2x(3x - 5) - 5(x - 2) - 18$ for x = 2.

42. Multiply and then verify :

$-3x^2y^2$ and $(x - 2y)$ for x = 1 and y = 2.

43. Multiply :

$2x^2 - 4x + 5$ by $x^2 + 3x - 7$

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44. Multiply :

$(ab - 1)(3 - 2ab)$

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45. Simplify: $(5 - x)(6 - 5x)(2 - x)$

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Exercise 11 D

1. Divide :

$-70a^3$ by $14a^2$

2. Divide :

$24x^3y^3$ by $-8y^2$

3. Divide :

$15a^4b$ by $-5a^3b$

4. Divide :

$-24x^4d$ by $-2x^2d$ (3)

5. Divide :

$63a^4b^5c^6$ by $-9a^2b^4c^3$

6. Divide :

$8x - 10y + 6c$ by 2

7. Divide :

$15a^3b^4 - 10a^4b^3 - 25a^3b^6$ by $-5a^3b^2$

8. Divide :

$$-14x^6y^3 - 21x^4y^5 + 7x^5y^4 \text{ by } 7x^2y^2$$

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9. Divide :

$$a^2 + 7a + 12 \text{ by a + 4}$$

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10. Divide :

$$x^2 + 3x - 54 \text{ by x - 6}$$

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11. Divide :

$$12x^2 + 7xy - 12y^2 \text{ by 3x + 4y}$$

12. Divide :

$x^6 - 8$ by $x^2 - 2$

13. Divide :

$6x^3 - 13x^2 - 13x + 30$ by $2x^2 - x - 6$

14. Divide :

$4a^2 + 12ab + 9b^2 - 25c^2$ by 2a + 3b + 5c

15. Divide :

$16 + 8x + x^6 - 8x^3 - 2x^4 + x^2$ by $x + 4 - x^3$

16. Find the quotient and the remainder (if any), when :

$a^3 - 5a^2 + 8a + 15$ is divided by a + 1.

17. Find the quotient and the remainder (if any), when :

$3x^4 + 6x^3 - 6x^2 + 2x - 7$ is divided by x - 3.

18. Find the quotient and the remainder (if any), when :

$6x^2 + x - 15$ is divided by 3x + 5. In each case, verify your answer.

19. The area of a rectangles is $x^3 - 8x^2 + 7$ and one of its sides ix x - 1. Find the length of the adjacent side.

20. The product of two numbers is $16x^4 - 1$. If one number is 2x - 1, find the other.

21. Divide $x^6 - y^6$ by the product of $x^2 + xy + y^2$ and $x - y$.

Exercise 11 E

1. Simplify :

$$a^2 - 2a + \{5a^2 - 3a - 4a^2\}$$

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2. Simplify :

$$x - y - \{x - y - (x + y) - \overline{x - y}\}$$

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3. Simplify :

$$-3(1 - x^2) - 2\{x^2 - (3 - 2x^2)\}$$

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4. Simplify :

$$2\{m - 3(n + \overline{m - 2n})\}$$

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5. Simplify :

$$3x - \left[3x - \left\{3x - \left(3x - \overline{3x - y}\right)\right\}\right]$$

6. Simplify :

$$p^2x - 2\left\{px - 3x\left(x^2 - \overline{3a - x^2}\right)\right\}$$

7. Simplify :

$$2[6 + 4\{m - 6(7 - \overline{n + p}) + q\}]$$

8. Simplify :

$$a - \left[a - \overline{b + a} - \left\{a - \left(a - \overline{b - a}\right)\right\}\right]$$

9. Simplify :

$$3x - \left[4x - \overline{3x - 5y} - 3\left\{2x - \left(3x - \overline{2x - 3y}\right)\right\}\right]$$

10. Simplify :

$$a^5 \div a^3 + 3a \times 2a$$

11. Simplify :

$$x^5 \div \left(x^2 \times y^2\right) \times y^3$$

12. Simplify :

$$\left(x^5 \div x^2\right) \times y^2 \times y^3$$

13. Simplify :

$$\left(y^3 - 5y^2\right) \div y \times (y - 1)$$

14. Simplify :

$$3a \times \left[8b \div 4 - 6\{a - \left(5a - \overline{3b - 2a}\right)\}\right]$$

15. Simplify :

$$7x + 4\left\{x^2 \div (5x \div 10)\right\} - 3\left\{2 - x^3 \div \left(3x^2 \div x\right)\right\}$$