

DEVESHTEDIA CLASSES
Above muthoot finance bank, awadhpuri, bhopal

WORKSHEET - FACTORISATION
Class 08 - Mathematics

Section A

1. Value of $\frac{c^2-(a-b)^2}{(b+c)^2-a^2} + \frac{a^2-(b-c)^2}{(a+c)^2-b^2} + \frac{b^2-(a-c)^2}{(a+b)^2-c^2}$ is [1]

a) $3[a - (b - c)]$
b) $a + b + c$
c) 3
d) 1

2. Factorise: $x^2 + 19x - 150$ [1]

a) $(x - 25)(x + 6)$
b) $(x + 25)(x - 6)$
c) $(x - 6)(x - 25)$
d) $(x - 25)(x - 6)$

3. Factorise : $x^2 + (a + b + c)x + ab + bc$ [1]

a) $(x + a)(x + b + c)$
b) $(x + c)(x + a + b)$
c) $(x - c)(x - a - b)$
d) $(x + b)(x + a + c)$

4. The factors of $\frac{x^2}{4} - \frac{y^2}{9}$ are _____. [1]

a) $\left(\frac{x}{2} + \frac{y}{9}\right) \left(\frac{x}{2} - \frac{y}{9}\right)$
b) $\left(\frac{x}{2} + \frac{y}{3}\right) \left(\frac{x}{2} - \frac{y}{3}\right)$
c) $\left(\frac{x}{4} + \frac{y}{9}\right) \left(\frac{x}{4} - \frac{y}{9}\right)$
d) Both $\left(\frac{x}{4} + \frac{y}{9}\right) \left(\frac{x}{4} - \frac{y}{9}\right)$ and $\left(\frac{x}{2} + \frac{y}{9}\right) \left(\frac{x}{2} - \frac{y}{9}\right)$

5. Factorise: $a(b - c) - d(b - c)$ [1]

a) $(b - c)$
b) $(a - d)$
c) $(a - d)(b - c)$
d) $(b + c)$

6. Factorise: $x^2 + 5\sqrt{5}x + 30$ [1]

a) $(x - 3\sqrt{5})(x + 2\sqrt{5})$
b) $(x - 2\sqrt{5})(x - 3\sqrt{5})$
c) $(x - 2\sqrt{5})(x + 3\sqrt{5})$
d) $(x + 2\sqrt{5})(x + 3\sqrt{5})$

7. Divide $15(y + 3)(y^2 - 16)$ by $5(y^2 - y - 12)$ [1]

a) $4(y + 3)$
b) $y(3y + 4)$
c) $3(y + 4)$
d) $(3y + 1)$

8. Factors of $a^4 + a^2 + 1$ are: [1]

a) $(a - 1)(a^2 - a + 1)$
b) $(a - 4)(a + 2)$
c) $(a^2 + a - 1)(a^2 + a + 2)$
d) $(a^2 + a + 1)(a^2 - a + 1)$

9. Divide $(32x^4y^3 - 16x^3y^4)$ by $(-8x^2y)$ [1]

a) $4x^3y - 2xy$ b) $-4x^2y^2 + 2xy^3$
 c) $4x^3y^2 + 2xy^3$ d) $-4xy^2 + 2xy^3$

10. The roots of $\frac{x}{x-1} + \frac{x-1}{x} = 2\frac{1}{2}$ are [1]
 a) (5, 4) b) (-1, 2)
 c) (5, -4) d) (1, 2)

11. Solve: $7x^2y^2z^2 \div 14xyz$ [1]
 a) xyz b) $\frac{1}{2}xyz$
 c) $2xyz$ d) 2

12. The solution set of $5x^2 - 7x - 6 = 0$ is [1]
 a) (1, 1) b) (0, 0)
 c) $(2, -\frac{5}{3})$ d) $(-\frac{3}{5}, 2)$

13. If $x \neq 0$ and when a polynomial is divided by $2x$, the quotient is $3x^4 - 9x^2 + 4$. Find the polynomial. [1]
 a) $6x^5 - 18x^3 + 8x$ b) $6x^5 - 18x^2 + 8$
 c) $6x^5 - 9x^2 + 8$ d) $6x^4 + 18x^2 + 8$

14. Factorise $x^3 - 27$ and choose the correct option. [1]
 a) $(x - 3)(x^2 - 3x + 9)$ b) $(x - 3)(x^2 + 3x + 9)$
 c) $(x + 3)(x^2 + 3x + 9)$ d) $(x - 3)(x^2 + 3x - 9)$

15. Factorise: $a^2 - 2ab + b^2 - c^2$ [1]
 a) $(a - b - c)(a - b - c)$ b) $(a - b - c)(a + b + c)$
 c) $(a + b + c)(a + b + c)$ d) $(a - b - c)(a - b + c)$

16. Divide the given polynomial by the given monomial: $(5x^2 - 6x) \div 3x$ [1]
 a) $(5x + 6)$ b) $\frac{1}{3}(5x - 6)$
 c) $\frac{1}{3}$ d) $(5x - 6)$

17. Factorise: $xy + y + xz + z$ [1]
 a) $(x + 1)(y + z)$ b) $(y + z)$
 c) $(x + 1)$ d) $(x - 1)$

18. The factors of $\sqrt{3}x^2 + 11x + 6\sqrt{3}$ are _____. [1]
 a) $(x + 3\sqrt{3})(\sqrt{3}x + 2)$ b) $(x - 3\sqrt{3})(\sqrt{3}x + 2)$
 c) $(x + 3\sqrt{3})(\sqrt{3}x - 2)$ d) $(x - 3\sqrt{3})(\sqrt{3}x - 2)$

19. Factorise: $15xy - 6x + 5y - 2$ [1]
 a) $(3x + 1)(5y - 2)$ b) $(3x + 1)$
 c) $(3x - 1)(7y - 3)$ d) $(5y - 2)$

20. Factorise: $8m^2 - 18n^2$ [1]

a) $2(2m - 3n)$
 b) $2(2m + 3n)$
 c) $(2m + 3n)(2m - 3n)$
 d) $2(2m + 3n)(2m - 3n)$

21. Factorize, $a^3 + 8b^3 + 6a^2b + 12ab^2$. [1]

a) $(a + 2b)^3$
 b) $(a - 2b)^3$
 c) $(-a + 2b)^3$
 d) $-(a + 2b)^3$

22. Factorise: $(5x - \frac{1}{x})^2 + 5(5x - \frac{1}{x}) + 6$ [1]

a) $(5x - \frac{1}{x} - 3)(5x - \frac{1}{x} - 2)$
 b) $(5x - \frac{1}{x} + 3)(5x - \frac{1}{x} + 2)$
 c) $(5x - \frac{1}{x} + 3)(5x - \frac{1}{x} - 2)$
 d) $(5x - \frac{1}{x} - 3)(5x - \frac{1}{x} + 2)$

23. Divide: $(10x - 2x) \div 5$ [1]

a) $2x - 5$
 b) $2x$
 c) -5
 d) 5

24. Factors of $\left(a^3 - \frac{1}{a^3} - 2a + \frac{2}{a}\right)$ are [1]

a) $(a - \frac{1}{a})(a^2 - \frac{1}{a^2} - 1)$
 b) $(a + \frac{1}{a})(a^2 + \frac{1}{a^2} + 1)$
 c) $(a - \frac{1}{a})(a^2 + \frac{1}{a^2} - 1)$
 d) $(a + \frac{1}{a})(a^2 + \frac{1}{a^2} - 1)$

25. Divide as directed: $4yz(z^2 + 6z - 16) \div 2y(z + 8)$ [1]

a) $2z$
 b) $2z(z - 2)$
 c) $(z + 2)$
 d) $(z - 2)$

26. The irreducible factorisation of $3a^3 + 6a$ is [1]

a) $3a(a^2 + 2)$
 b) $3(a^3 + 2)$
 c) $a(3a^2 + 6)$
 d) $3 \times a \times a \times a + 2 \times 3 \times a$

27. The factorisation of $x^2 + x + xy + y + zx + z$ is. [1]

a) $(x + y + z)(y + z)$
 b) $(x + y + z)(z + x)$
 c) $(x + y + z)(x + 1)$
 d) $(x + y + z)(x + y)$

28. Which of the following is quotient obtained on dividing $-18xyz^2$ by $-3xz$? [1]

a) $6xy^2$
 b) $-6yz$
 c) $6yz$
 d) $6xy$

29. Factorising $(x - y)^2 + 4xy - z^2$, we get [1]

a) $(x - y + z)(x + y - z)$
 b) $(x + y + z)(x + y - z)$
 c) $(x - y - z)(x + y - z)$
 d) $(x + y - z)(x + y - z)$

30. One of the factors of $x^7 + xy^6$ is: [1]

i. $x^2 + y^2$
 ii. x
 iii. either i or ii

iv. Neither i nor ii

- a) Option (ii)
- b) Option (i)
- c) Option (iii)
- d) Option (iv)

31. **Assertion (A):** Factorise: $(x - 2)^2 + (2 - x)$. It is equals to $(x - 2)(x - 1)$.

[1]

Reason (R): Regrouping is done in more than one way. But the factors remain the same.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

32. **Assertion (A):** On dividing $4ab(16a^2 - 25b^2)$ by $2ab(4a - 5b)$, we get $2(4a + 5b)$.

[1]

Reason (R): To divide a polynomial by a polynomial, factorise both polynomials and cancel out the common terms.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

33. **Assertion (A):** Divide $(9m^5 + 12m^4 - 6m^2)$ by $3m^2$. the result is $(3m^3 + 4m^2 - 2)$.

[1]

Reason (R): Divide each term of the polynomial by the given monomial by using the rules of division of a monomial by a monomial.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

34. **Assertion (A):** The factors of algebraic expression $q^2 - 10q + 21$ are $(q - 3)(q - 7)$.

[1]

Reason (R): $(x + a)(x + b) = x^2 + (a + b)x + ab$.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

35. **Assertion (A):** On dividing $-\left(\frac{12}{15}\right) a^3bc^2$ by $\left(\frac{18}{10}\right) a^2c$ we get the quotient $-\left(\frac{4}{9}\right) ac$.

[1]

Reason (R): To divide a monomial by a monomial, divide the numerical coefficient by the numerical coefficient and the literal coefficient by literal coefficient.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

Section B

36. Factorise: $4y^2 - 12y + 9$

[2]

37. Carry out the division: $34x^3y^3z^3 \div 51xy^2z^3$

[2]

38. Write the greatest common factor of the terms: $21pqr, -7p^2q^2r^2, 49p^2qr$

[2]

39. Factorise the following expression : $p^2 - 10p + 25$

[2]

40. Factorise : $z - 7 + 7xy - xyz$ [2]
 41. Factorise: $49p^2 - 36$ [2]
 42. Factorise $16x^4 - 625y^4$ using the identity $a^2 - b^2 = (a + b)(a - b)$. [2]
 43. Factorise the expressions and divide them as directed: $(x^3 + x^2 - 132x) \div x(x - 11)$. [2]
 44. Factorise $x^2 + 4x - 77$ [2]
 45. Factorise $p^2 - 16p - 80$ [2]

Section C

46. Divide the given polynomial by the given monomial: $8(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3) \div 4x^2y^2z^2$ [3]
 47. Factorise: $(l + m)^2 - (l - m)^2$ [3]
 48. Factorise: $p^4 - 81$ [3]
 49. Divide as directed: $20(y + 4)(y^2 + 5y + 3) \div 5(y + 4)$ [3]
 50. Divide the given polynomial by the given monomial: $(3y^8 - 4y^6 + 5y^4) \div y^4$ [3]
 51. Factorise: $a^4 - 2a^2b^2 + b^4$ [3]
 52. Divide the given polynomial by the given monomial: $(p^3q^6 - p^6q^3) \div p^3q^3$ [3]
 53. Divide: $24(x^2yz + xy^2z + xyz^2)$ by $8xyz$. [3]
 54. Divide $24(x^2yz + xy^2z + xyz^2)$ by $8xyz$ using both the methods. [3]
 55. Work out the division: $96abc(3a - 12)(5b - 30) \div 144(a - 4)(b - 6)$ [3]

Section D

Question No. 56 to 60 are based on the given text. Read the text carefully and answer the questions: [5]

Once Maths teacher gave the following expression for factorization:

$$4x^2 + 20x + 25$$

Ajay and Vijay were together doing the solution

1. Ajay got one idea and wrote the expression as:

$$(2x)^2 + 2(2x)(5) + 5^2$$

2. Vijay suddenly remembered one idea that $20x = 2(2x)(5)$

So the expression becomes

$$(2x)^2 + 2(2x)(5) + 5^2$$

3. Now Ajay said, Let us take $a = 2x$ and $b = 5$, Then we get

$$4x^2 + 20x + 25 = a^2 + 2ab + b^2$$

4. wahol! This is the first identity, $a^2 + 2ab + b^2 = (a+b)$

Thus

$$4x^2 + 20x + 25$$

$$= (a + b)^2$$

$$= (2x + 5)^2$$

Using this idea now answer the following questions.

56. What are the factors of $9x^2 + 12x + 4$?

a) $(5x + 2)^2$

b) $(2x - 3)^2$

c) $(3x + 2)^2$

d) $(2x + 3)^2$

57. What are the factors of $9x^2 + 6x + 1$?

a) $(3x + 1)^2$

b) $(2x + 3)^2$

c) $(5x + 2)^2$

d) $(3x + 2)^2$

58. What are the factors of $16x^2 + 16x + 4$?

a) $(2x - 3)^2$

b) $(3x + 2)^2$

c) $(4x + 2)^2$

d) $(5x + 2)^2$

59. If $81x^2 + 90x + 25 = (a + b)^2$ then $a = \underline{\hspace{2cm}}$ and $b = \underline{\hspace{2cm}}$

60. $(4x + 3)^2 = 4x^2 + 12x + 9$

a) True

b) False

Question No. 61 to 65 are based on the given text. Read the text carefully and answer the questions:

[5]

Dividing Polynomials by Monomials: Splitting the Terms Method

In this method, we will split the terms of the polynomial separated by the operator (+) or (-) between them and simplify each term. Let's take an example to understand this. For example, $(6y^2 + 3y) \div (3y)$ can be solved by following the steps of dividing polynomials by monomials given below:

1. Split the terms of the polynomial $6y^2 + 3y$. The terms are $6y^2$ and $3y$.
2. Now each term will be divided by the monomial $3y$ i.e., $(6y^2 \div 3y) + (3y \div 3y)$.
3. Each term will be simplified to its lowest form by canceling out the common factors i.e., $6y^2 \div 3y = 2y$ and $3y \div 3y = 1$.
4. The individual results are now combined with the (+) operator between them. Therefore the result is $2y + 1$.
5. Hence $(6y^2 + 3y) \div (3y) = 2y + 1$.

61. What is the result of $(3y^8 - 4y^6 + 5y^4) \div y^4$

a) $3y^4 - y^4 + 5y^2$

b) $3y^4 - 4y^4 + y^2$

c) $3y^4 - 4y^2 + 5$

d) $y^4 + 4y^4 + 5y^2$

62. What is the result of $(p^6q^3 - p^3q^6) \div p^3q^3$?

a) $p - q$

b) $p + q$

c) $p^3 + q^3$

d) $p^3 - q^3$

63. What is the value of $(12x^3 + 15x^2 + 21x) \div 3x$?

a) $4x^2 + 5x$

b) $4x^2 + 7$

c) $5x + 7$

d) $4x^2 + 5x + 7$

64. $24(x^4y^2z^2 + x^2y^4z^2 + x^2y^2z^4) \div 8x^2y^2z^2 = 3(x^2 + y^2 + z^2)$

a) True

b) False

65. $(x^2yz + xy^2z + xyz^2) \div xyz = \underline{\hspace{2cm}}$

66. Factorize $x^4 - y^4$ [5]

67. Factorise the expression and divide them as directed: $(m^2 - 14m - 32) \div (m + 2)$ [5]

68. Factorise the expression and divide them as directed: $39y^3(50y^2 - 98) \div 26y^2(5y + 7)$ [5]

69. Factorise the quadratic trinomials. [5]

a $6x^2 + 11x - 2$

b $x^2 - 5x + 6$

c $3x^2 + 12x - 15$

d $3x^2 - 10x + 7$

e $x^2 + 14x + 48$

f $2x^2 - 3x - 5$

70. Factorize $12x^3y^4 + 16x^2y^5 - 4x^5y^2$ [5]

71. Factorize $a^2 - 1 + 2x - x^2$. [5]

72. Factorise the expression and divide them as directed: $(5p^2 - 25p + 20) \div (p - 1)$ [5]

73. Factorize $12x^2 - 23xy + 10y^2$ [5]

74. Factorize $(x^2 + 3x)^2 - 5(x^2 + 3x) - y(x^2 + 3x) + 5y$ [5]

75. Factorize $6x^2 - 13x + 6$ [5]