Review Exercise 5

Q.1 Filling the blanks:

1. The factor of x^2-5x+6 are _____.

(a) $x+1, x-6$ **(b)** $x-2, x-3$

(c) $x+6, x-1$ **(d)** $x+2, x+3$

2. Factors of $8x^3+27y^3$ are _____.

(a) $(2x-3y),(4x^2+9y^2)$ **(b)** $(2x-3y),(4x^2-9y^2)$

(c) $(2x+3y),(4x^2-6xy+9y^2)$ **(d)** $(2x-3y),(4x^2+6xy+9y^2)$

3. Factors of $3x^2-x-2$ are_____.

(a) $(x+1),(3x-2)$ **(b)** $(x+1),(3x+2)$

(c) $(x-1),(3x-2)$ **(d)** $(x-1),(3x+2)$

4. Factors of a^4-4b^4 are_____.

(a) $(a-b),(a+b),(a^2+4b^2)$ **(b)** $(a^2-2b^2),(a^2+2b^2)$

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

5. What will be added to complete the square of $9a^2-12ab$?.....

(a) $-16b^2$ **(b)** $16b^2$ **(c)** $4b^2$ **(d)** $-4b^2$

6. Find m so that x^2+4x+m is a complete square

(a) 8 **(b)** –8

(c) 4 **(d)** 16

7. Factors of $5x^2-17xy-12y^2$ are_____.

(a) $(x+4y),(5x+3y)$ **(b)** $(x-4y),(5x-3y)$

(c) $(x-4y),(5x+3y)$ **(d)** $(5x-4y),(x+3y)$

8. Factors of $27x^3-\frac{1}{x^3}$ are

(a) $\left(3x-\frac{1}{x}\right),\left(9x^2+3+\frac{1}{x^2}\right)$ **(b)** $\left(3x+\frac{1}{x}\right),\left(9x^2+3+\frac{1}{x^2}\right)$

(c) $\left(3x-\frac{1}{x}\right),\left(9x^2-3+\frac{1}{x^2}\right)$ **(d)** $\left(\frac{3x+1}{x}\right),\left(9x^2-3+\frac{1}{x^2}\right)$

ANSWERS KEYS

1	2	3	4	5	6	7	8
b	c	d	b	c	c	c	a

Q.2 Completion items

(i) $x^2+5x+6=$ _____

(ii) $4a^2-16=$ _____

(iii) $4a^2+4ab+($_____$)$ **is a complete square.**

(iv) $\frac{x^2}{y^2}-2+\frac{y^2}{x^2}=$ _____

(v) $(x+y)(x^2-xy+y^2)=$ _____

(vi) **Factored form of** x^4-16 **is** _____

(vii) **If x–2 is factor of** $P(x)=x^2+2kx+8$ **then** = _____

ANSWER KEYS

(i) $(x+3)(x+2)$

(ii) $(2a+4)(2a-4)=4(a+2)(a-2)$

(iii) $(b)^2$

(iv) $\left(\frac{x}{y}-\frac{y}{x}\right)^2$

(v) x^3+y^3

(vi) $(x+2)(x-2)(x^2+4)$

(vii) -3

Q.3 Factorize the following

(i) $x^2+8x+16-4y^2$

Solution: $x^2+8x+16-4y^2$

$=\left[x^2+8x+16\right]-4y^2$

$=\left[(x)^2+2(x)(4)+(4)^2\right]-(2y)^2$

$=(x+4)^2-(2y)^2$

Now arrange them

$=(x+4+2y)(x+4-2y)$

$=(x+2y+4)(x-2y+4)$

(ii) $4x^2-16y^2$

Solution: $4x^2-16y^2$

$=4\left[x^2-4y^2\right]$

$=4\left[(x)^2-(2y)^2\right]$

$=4(x-2y)(x+2y)$

(iii) $9x^2+24x+3x+8$

Solution: $=9x^2+24x+3x+8$

$=3x(3x+8)+1(3x+8)$

$=(3x+8)(3x+1)$

(iv) $1-64z^3$

Solution: $1-64z^3$

$=(1)^3-(4z)^3$

$=(1-4z)\left[(1)^2+(1)(4z)+(4z)^2\right]$

$=(1-4z)(1+4z+16z^2)$

(v) $8x^3-\left(\frac{1}{3y}\right)^3$

$=(2x)^3-\left(\frac{1}{3y}\right)^3$

$=\left(2x-\frac{1}{3y}\right)\left(4x^2+\frac{2x}{3y}+\frac{1}{9y^2}\right)$

(vi) $2y^2+5y-3$

Solution: $=2y^2+6y-y-3$

$=2y(y+3)-1(y+3)$

$=(2y-1)(y+3)$

(vii) x^3+x^2-4x-4

Solution: x^3+x^2-4x-4

$=x^2(x+1)-4(x+1)$

$=(x+1)(x^2-4)$

$=(x+1)(x-2)(x+2)$

(viii) $25m^2n^2+10mn+1$

Solution: $25m^2n^2+10mn+1$

$=(5mn)^2+2(5mn)(1)+(1)^2$

$=(5mn+1)^2$

(ix) $1-12pq+36p^2q^2$

Solution: $1-12pq+36p^2q^2$

$\therefore (a)^2-2ab+(b)^2$

$=(1)^2-2(1)(6pq)+(6pq)^2$

$=(1-6pq)^2$

Unit 5: Factorization

Overview

Factorization:

The process of expressing an algebraic expression in terms of its factors is called factorization.

Remainder Theorem:

If a polynomial $p(x)$ is divided by a linear divisor $(x-a)$, then the remainder is $p(a)$.

Zero of a Polynomial:

If a specific number $x=a$ is substituted for the variable x in a polynomial $p(x)$ so that the value $p(a)$ is zero, then $x=a$ is called a zero of the polynomial $p(x)$.

Factor Theorem:

The polynomial $(x-a)$ is a factor of the polynomial $p(x)$ if and only if $p(a)=0$.

Rational Root Theorem:

Let $a_0x^n+a_1x^{n-1}+\ldots+a_{n-1}x+a_n=0,\ a_0\neq 0$ be a polynomial equation of degree n with integral coefficients. If $\frac{p}{q}$ is a rational root (expressed in lowest terms) of the equation, then p is a factor of the constant term a_n and q is a factor of the leading coefficient a_0.