# MATHS

# BOOKS - SWAN PUBLICATION

# POLYNOMIALS

## Exercise 2 1

**1.** Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $4x^2 - 3x + 7$

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**2.** Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $y^2 + \sqrt{2}$

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**3.** Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $3\sqrt{t} + t\sqrt{2}$

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**4.** Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $y + \frac{2}{y}$

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**5.** Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:- $x^{10} + y^3 + t^{50}$

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**6.** Write the coefficients of $x^2$ in each of the following: $2 + x^2 + x$

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**7.** Write the coefficients of $x^2$ in each of the following: $2 - x^2 + x^3$

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**8.** Write the coefficients of $x^2$ in each of the following: $\frac{\pi}{2}x^2 + x$

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**9.** Write the coefficients of $x^2$ in each of the following: $\sqrt{2x} - 1$

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**10.** Give one example each of a binomial of degree 35, and of a monomial of degree 100.

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**11.** Write the degree of each of the following polynomials:

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

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**12.** Write the degree of each of the following polynomials

$4 - y^2$

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**13.** Write the degree of each of the following polynomials

$5t - \sqrt{7}$

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**14.** Write the degree of each of the following polynomials

3?

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**15.** Classify the following as linear, quadratic and cubic polynomial : $x^2 + x$.

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**16.** Classify the following as linear, quadratic and cubic polynomial : $x - x^3$.

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**17.** Classify the following as linear, quadratic and cubic polynomial : $y + y^2 + 4$.

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**18.** Classify the following as linear, quadratic and cubic polynomial : $1 + x$.

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**19.** Classify the following as linear, quadratic and cubic polynomial : $3t$.

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**20.** Classify the following as linear, quadratic and cubic polynomial : $r^2$.

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**21.** Classify the following as linear, quadratic and cubic polynomial : $7x^3$

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## Exercise 2 2

**1.** Find the value of the polynomial $5x - 4x^2 + 3$ at $x = 0$.

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**2.** Find the value of the polynomial $5x - 4x^2 + 3$ at $x = -1$.

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**3.** Find the value of the polynomial $5x - 4x^2 + 3$ at $x = 2$.

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**4.** Find $p(0), p(1)$ and $p(2)$ for the following polynomial : $p(y) = y^2 - y + 1.$

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**5.** Find p(0), p(1) and p(3) for each of the following polynomials: $p(t) = 2 + t + 2t^2 - t^3$

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**6.** Find p(0), p(1) and p(4) for each of the following polynomials: $p(x) = x^3$

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**7.** Find p(0), p(1) and p(5) for each of the following polynomials: $p(x) = (x-1)(x+1)$

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**8.** Verify whether the following is zero of the polynomial, indicated against it : $p(x) = 3x + 1, x = -\frac{1}{3}$.

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**9.** Verify whether the following is zero of the polynomial, indicated against it : $p(x) = 5x - \pi, x = \frac{4}{5}$.

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**10.** Verify whether the following is zero of the polynomial, indicated against it : $p(x) = x^2 - 1, x = 1, -1$.

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**11.** Verify whether the following is zero of the polynomial, indicated against it : $p(x) = (x+1)(x-2), x = -1, 2.$

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**12.** Verify whether the following is zero of the polynomial, indicated against it : $p(x) = x^2, x = 0.$

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**13.** Verify whether the following is zero of the polynomial, indicated against it : $p(x) = lx + m, x = -\frac{m}{l}.$

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**14.** Verify whether the following are zeroes of the polynomial, indicated against them,

$p(x) = 3x^2 - 1, x = \frac{1}{\sqrt{3}}, \frac{2}{\sqrt{3}}$

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**15.** Verify whether the following is zero of the polynomial, indicated against it : $p(x) = 2x + 1, x = \frac{1}{2}.$

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**16.** Find the zero of the polynomial in each of the following cases:

$p(x) = x + 5$

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**17.** Find the zero of the polynomial in each of the following cases

$p(x) = x - 5$

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**18.** Find the zero of the polynomial in the following : $p(x) = 2x + 5$ is real number.

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**19.** Find the zero of the polynomial in each of the following cases

p(x)=3x-2

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**20.** Find the zero of the polynomial in each of the following cases:

$p(x) = 3x + 5$

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**21.** Find the zero of the polynomial in each of the case :

$p(x) = ax, a \neq 0$ are real number

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**22.** Find the zero of the polynomial in the following : $p(x) = cx + d, c \neq 0, c, d$ is real number.

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## Exercise 2 3

**1.** Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by $x + 1$

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**2.** Find the remainder when $x^3 + 3x^2 + 3x + 1$ divided by

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

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**3.** Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by

$x$

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**4.** Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by : $x + \pi$.

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**5.** Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by : $5 + 2x$.

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**6.** On dividing $x^3 - ax^2 + 6x - a$ by $x - a$ we get remainder :

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**7.** Check whether 7 + 3x is a factor of $3x^3 + 7x$

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## Exercise 2 4

**1.** Determine which of the following polynomials has (x + 2) a factor :

$x^4 + x^3 + x^2 + x + 1$

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**2.** Determine which of the following polynomials has (x + 2) a factor :

$x^4 + x^3 + x^2 + x + 1$

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**3.** Determine which of the following polynomials has (x + 1) a factor:

$x^4 + 3x^3 + 3x^2 + x + 1$

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**4.** Determine which of the following polynomials has (x + 1) a factor:

$x^3 - x^2 - \left(2 + \sqrt{2}\right)x + \sqrt{2}$

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**5.** Use the Factor Theorem to determine whether g(x) is a factor of p(x) in each of the following cases:

$p(x) = 2x^3 + x^2 - 2x - 1, g(x) = x + 1$

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**6.** Use the Factor Theorem to determine whether g(x) is a factor of p(x) in each of the following cases:

$p(x) = x^3 + 3x^2 + 3x + 1, g(x) = x + 2$

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**7.** Use the Factor Theorem to determine whether g(x) is a factor of p(x) in each of the following cases:

$p(x) = x^3 - 4x^2 + x + 6, g(x) = x - 3$

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**8.** Find the value of k, if $x - 1$ is a factor of $p(x)$ of the following case :

$p(x) = x^2 + x + k.$

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**9.** Find the value of k, if $x - 1$ is a factor of $p(x)$ of the following case :

$p(x) = 2x^2 + kx + \sqrt{2}.$

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**10.** Find the value of k, if $x - 1$ is a factor of $p(x)$ of the following case

: $p(x) = kx^2 - 3x + k.$

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**11.** Find the value of k, if $x - 1$ is a factor of $p(x)$ of the following case :

$p(x) = kx^2 - 3x + k.$

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**12.** Factorise : $12x^2 - 7x + 1$.

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**13.** Factorise : $2x^2 + 7x + 3$.

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**14.** The factors of $6x^2 + 5x - 6$ are :

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**15.** Factorise : $3x^2 - x - 4$.

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**16.** Factorise : $x^3 - 2x^2 - x + 2$

Watch Video Solution

**17.** Factorise : $x^3 - 3x^2 - 9x - 5$

Watch Video Solution

**18.** Factorise : $x^3 + 13x^2 + 32x + 20$

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**19.** Factorise : $2y^3 + y^2 - 2y - 1.$

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## Exercise 2 5

**1.** Use the suitable identity to find the following product : $(x+4)(x+10)$.

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**2.** Use the suitable identity to find the following product : $(x+8)(x-10)$.

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**3.** Use the suitable identity to find the following product : $(3x+4)(3x-5)$.

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**4.** Use the suitable identity to find the following product : $\left(y^2+\frac{3}{2}\right)\left(y^2-\frac{3}{2}\right)$.

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**5.** Use the suitable identity to find the following product : $(3-2x)(3+2x)$.

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**6.** Evaluate the following product without multiplying directly : $103 \times 107$.

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**7.** Evaluate the following product without multiplying directly : $95 \times 96$

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**8.** Evaluate the following product without multiplying directly : $104 \times 96$.

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**9.** Factorise the following using appropriate identities : $9x^2 + 6xy + y^2$.

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**10.** Factorise the following using appropriate identities : $4y^2 - 4y + 1$.

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**11.** Factorise the following using appropriate identities : $x^2 - \frac{y^2}{100}$.

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**12.** Expand the following using suitable Identities : $(x + 2y + 4z)^2$.

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**13.** Expand each of the following, using suitable identifies :

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

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**14.** Expand the following using suitable Identities : $(-2x + 3y + 2z)^2$

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**15.** Expand the following using suitable Identities : $(3a - 7b - c)^2$.

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**16.** Expand the following using suitable Identities : $(-2x + 5y - 3z)^2$.

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**17.** Expand the following using suitable Identities : $\left[\frac{1}{4}a - \frac{1}{2}b + 1\right]^2$.

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**18.** Factorize : $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$

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**19.** Factorise : $2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8xz$

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**20.** Write the following cube in expanded : $(2x + 1)^3$.

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**21.** Write the following cube in expanded : $(2a - 3b)^3$.

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**22.** Write the following cube in expanded : $\left[\frac{3}{2}x + 1\right]^3$.

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**23.** Write the following cube in expanded : $\left[x - \frac{2}{3}y\right]^3$.

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**24.** Evaluate the following using suitable identity : $(99)^3$.

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**25.** Evaluate the following using suitable identity : $(102)^3$.

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**26.** Evaluate the following using suitable identity : $(998)^3$.

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**27.** Factorise the following : $8a^3 + b^3 + 12a^2b + 6ab^2$.

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**28.** Factorise each of the following: $8a^3 - b^3 - 12a^2b + 6ab^2$

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**29.** Factorise the following : $27 - 125a^3 - 135a + 225a^2$.

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**30.** Factorise ech of the

$64a^3 - 27b^3 - 144a^2b + 108ab^2$

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**31.** Factorise the following : $27p^3 - \frac{1}{216} - \frac{9}{2}p^2 + \frac{1}{4}p.$

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**32.** Simplify

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

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**33.** Prove that $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

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**34.** Factorise each of the following:

$27y^3 + 125x^3$

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**35.** Factorise the following : $64m^3 - 343n^3$.

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**36.** Factorise : $27x^3 + y^3 + z^3 - 9xyz$.

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**37.** Verify that

$$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)\left[(x - y)^2 + (y - z)^2 + (z - x)^2\right]$$

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**38.** If $x + y + z = 0$, show that $x^3 + y^3 + z^3 = 3xyz$.

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**39.** Without actually calculating the cubes, find the value of each of the following: $(-12)^3 + (7)^3 + (5)^3$

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**40.** Without actually calculating the cubes, find the value of each of the following: $(28)^3 + (-15)^3 + (-13)^3$

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**41.** Give possible expressions for the length and breadth of each of the following rectangles, in which their areas are given: Area : $25a^2 - 35a + 12$

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**42.** Give possible expressions for the length and breadth of each of the following rectangles, in which their areas are given: Area : $35y^2 + 13y - 12$

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**43.** What are the possible expressions for the dimensions of the cuboids whose volumes are given below? Volume : $3x^2 - 12x$

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**44.** What are the possible expressions for the dimensions of the cuboids whose volumes are given below? Volume : $12ky^2 + 8ky - 20k$

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Objective Type Questions

**1.** State whether the statements are True (T) and False (F).

A polynomial having only one term is called monomial.

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**2.** State whether the statements are True (T) and False (F).

A polynomial having two terms is called trinomial.

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**3.** State whether the statements are True (T) and False (F).

A polynomial having three terms is called binomial.

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**4.** State whether the statements are True (T) and False (F).

The degree of a non-zero constant polynomial is zero.

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**5.** State whether the statements are True (T) and False (F).

The highest power of the variable in a polynomial is called the degree of the polynomial.

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**6.** State whether the statements are True (T) and False (F).

The degree of a non-zero constant polynomial is zero.

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**7.** State whether the statements are True (T) and False (F).

A real number 'a' is zero of a polynomial p (x) if p (a) =0, then a is also called a root of the equation p (x) = 0.

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**8.** Find the degree of the polynomial

$p(x) = 1 - 2y + 3y^6$.

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**9.** Tell the degree of the polynomial

$p(x) = 7$

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**10.** By using remainder theorem, find the remainder, when $p(x) = x^2 + 4x + 2$ is divided by $x + 2$.

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**11.** Define linear polynomial.

Watch Video Solution

**12.** Define quadratic polynomial

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**13.** Determine whether 2 and 3 are the zeroes of the polynomial $x^2 - 5 + 6$ or not.

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**14.** State remainder theorem.

Watch Video Solution

**15.** State factor theorem.

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**16.** Factorise. : $49 - 64x^2$

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**17.** Factorise : $x^2 + 5x - 24$.

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**18.** Fill in the blank

Division of any number by zero is not .....

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**19.** Fill in the blank

A polynomial of degree 3 is called .....

Watch Video Solution

**20.** Fill in the blank

A polynomial of degree 4 is called .....

Watch Video Solution

**21.** Degree of zero polynomial is

Watch Video Solution

**22.** Fill in the blank

Dividen = (..... $\times$ quotinet ) + Remainder.

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**23.** Fill in the blank

$(x - a)$ is a factor of p (x) if.....

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