STUDY mate
helps excel in boards

# Chapter End Test

(2019-20)

Date : ____________
Duration : 45 Min.
Max. Marks : 25

## Mathematics

**Topic:** Polynomials

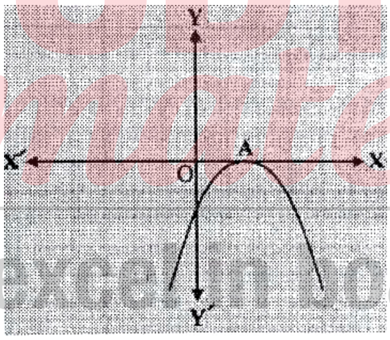
Class
X

***Instructions:***

- All questions are compulsory.
- Section A is comprised of 15 multiple choice questions carrying 1 mark each.
- Section B is comprised of 3 questions carrying 3, 3 and 4 marks respectively.
- Use of calculator is not permitted.
- Objectives of test paper. (i) To assess the conceptual understanding of students. (ii) To make them attempt subjective questions as required in CBSE Board Exam.

## Section – A

**1.** The number of zeroes of the polynomial $f(x)$ from the graph is:




(a) 0 (b) 1 (c) 2 (d) 3

**2.** A quadratic polynomial whose zeroes are 3 and –4 is:

(a) $x^2 - x + 12$ (b) $x^2 + x + 12$ (c) $2x^2 + 2x - 24$ (d) None of these

**3.** The zeroes of the polynomial $x^2 - 3$ are:

(a) 2 and 5 (b) –2 and 5 (c) –2 and -5 (d) None of the these

**4.** If α, β are the zeroes of the polynomials $f(x) = 4x^2 + 3x + 7$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ is:

(a) $\frac{7}{3}$ (b) $\frac{-7}{3}$ (c) $\frac{3}{7}$ (d) $\frac{-3}{7}$

**5.** A cubic polynomial can have atmost ___________ zeroes.

(a) 0 (b) 1 (c) 2 (d) 3

**6.** If $x + 2$ is a factor of $x^2 + ax + 2b$ and $a + b = 4$, then

(a) $a = 1, b = 3$ (b) $a = 3, b = 1$ (c) $a = -1, b = 5$ (d) $a = 5, b = -1$

**7.** A real number a is called a zero of the polynomial $f(x)$ then:

(a) $f(a) = -1$ (b) $f(a) = 1$ (c) $f(a) = 0$ (d) $f(a) = -2$

**8.** If the product of two of the zeroes of the polynomial $2x^3 - 9x^2 + 13x - 6$ is 2, the third zero of the polynomial is:

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

**9.** On dividing $x^3 + 3x^2 + 3x + 1$ by $x + \pi$ we get the remainder:

(a) $-\pi^3 + 3\pi^2 - 3\pi + 1$ (b) $\pi^3 - 3\pi^2 + 3\pi + 1$ (c) $-\pi^3 - 3\pi^2 - 3\pi - 1$ (d) $-\pi^3 + 3\pi - 3\pi - 1$

**10.** If one zero of the polynomial $p(x) : 6x^2 + 17x + k$ is reciprocal of other, then value of $k$ is

(a) 1 (b) 6 (c) $\frac{1}{6}$ (d) None of these

**11.** If sum of the zeroes of polynomial $p(x) : kx^2 + 2x + 3k$ is equal to their product, then value of $k$ is

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

**12.** The product and sum of zeroes of the quadratic polynomial $ax^2 + bx + c$ respectively are:

(a) $\frac{b}{a}, \frac{c}{a}$ (b) $\frac{c}{a}, \frac{-b}{a}$ (c) $\frac{c}{a}, \frac{b}{a}$ (d) $\frac{-c}{a}, \frac{b}{a}$

**13.** The other two zeroes of the polynomial $x^3 - 8x^2 + 19x - 12$ if it's one zero is $x = 1$:

(a) 3, –4 (b) –3, –4 (c) –3, 4 (d) 3, 4

**14.** If $\alpha$, $\beta$ are the zeroes of the polynomial $f(x) = x^2 - p(x + 1) - c$, then $(\alpha + 1)(\beta + 1)$ is:

(a) $c - 1$ (b) $1 - c$ (c) $c$ (d) $1 + c$

**15.** The polynomial which when divided by $-x^2 + x - 1$ gives a quotient $x - 2$ and remainder is 3, is

(a) $x^3 - 3x^2 + 3x - 5$ (b) $-x^3 - 3x^2 - 3x - 5$ (c) $-x^3 + 3x^2 - 3x + 5$ (d) $x^3 - 3x^2 - 3x + 5$

## Section – B

**1.** If one of the zeroes of the quadratic polynomial $f(x) = (k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other, find $k$.

**2.** Find the zeroes of quadratic polynomial $x^2 + 7x + 12$, and verify the relation between zeroes and its coefficients.

**3.** Find all the zeroes of the polynomial $f(x) = 2x^4 - 3x^3 - 3x^2 + 6x - 2$, if two of its zeroes are $\sqrt{2}$ and $-\sqrt{2}$.

**OR**

If the polynomial $6x^4 + 8x^3 + 17x^2 + 21x + 7$ is divided by another polynomial $3x^2 + 4x + 1$,the remainder comes out to be $ax + b$, find $a$ and $b$.

❖❖❖❖❖

STUDY mate
helps excel in boards

# Hints/Solutions to Chapter End Test

(2019-20)

| Date : ____________ | Mathematics | Class |
|---|---|---|
| Duration : 45 Min. | **Topic:** Polynomials | X |
| Max. Marks : 25 | | |

## Section – A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1.** | (b) | **2.** | (c) | **3.** | (d) | **4.** | (d) |
| **5.** | (d) | **6.** | (b) | **7.** | (c) | **8.** | (c) |
| **9.** | (a) | **10.** | (b) | **11.** | (c) | **12.** | (b) |
| **13.** | (d) | **14.** | (b) | **15.** | (c) | | |

## Section – B

**1.** $f(x) = (k^2 + 4)x^2 + 13x + 4k$

Let $\alpha$ and $\frac{1}{\alpha}$ are the zeroes of $f(x)$.

$\therefore \quad \alpha \times \frac{1}{\alpha} = \frac{c}{a}$

$\Rightarrow \quad 1 = \frac{4k}{k^2 + 4}$

$\Rightarrow \quad k^2 - 4k + 4 = 0$

$\Rightarrow \quad (k - 2)^2 = 0$

$\Rightarrow \quad k - 2 = 0$

$\therefore \quad k = 2$

**2.** $f(x) = x^2 + 7x + 12 = x^2 + 4x + 3x + 12$

$\Rightarrow \quad f(x) = x(x + 4) + 3(x + 4)$

$\Rightarrow \quad f(x) = (x + 4)(x + 3)$

Zeroes of $f(x)$ are given by

$f(x) = 0$

$\Rightarrow \quad x + 4 = 0 \quad$ or $\quad x + 3 = 0$

$\Rightarrow \quad x = -4 \quad$ or $\quad x = -3$

Hence, zeroes of $f(x)$ are $\alpha = -4$, $\beta = -3$.

Now, sum of zeroes $= \alpha + \beta = (-4) + (-3) = -7$

and $\frac{-\text{coefficient of } x}{\text{coefficient of } x^2} = \frac{-7}{1} = -7$

$\therefore \quad$ Sum of zeroes $= \frac{-\text{coefficient of } x}{\text{coefficient of } x^2}$

Product of zeroes $= \alpha\beta = (-4)(-3) = 12$

and $\frac{\text{constant term}}{\text{coefficient of } x^2} = \frac{12}{1} = 12$

$\therefore \quad$ Product of zeroes $= \frac{\text{constant term}}{\text{coefficient of } x^2}$

**3.** $\sqrt{2}$ and $-\sqrt{2}$ are zeroes of $f(x)$.

$\therefore \quad (x - \sqrt{2})(x + \sqrt{2})$ is a factor of $f(x)$.

$\Rightarrow \quad x^2 - 2$ is a factor of $f(x)$.

Now, we divide $f(x)$ by $x^2 - 2$ to get other zeroes.

$$
\begin{array}{r|l}
 & 2x^2 - 3x + 1 \\
x^2 - 2 & 2x^4 - 3x^3 - 3x^2 + 6x - 2 \\
 & 2x^4 \qquad - 4x^2 \\
 & - \qquad\quad + \\
\hline
 & -3x^3 + x^2 + 6x - 2 \\
 & -3x^3 \qquad + 6x \\
 & + \qquad\quad - \\
\hline
 & x^2 - 2 \\
 & x^2 - 2 \\
 & - \quad + \\
\hline
 & 0
\end{array}
$$

By division algorithm, we have

$f(x) = g(x) \times q(x) + r(x)$

$\Rightarrow \quad 2x^4 - 3x^3 - 3x^2 + 6x - 2 = (x^2 - 2)\,(2x^2 - 3x + 1)$

$= (x - \sqrt{2})(x + \sqrt{2})(2x^2 - 2x - x + 1)$

$= (x - \sqrt{2})(x + \sqrt{2})(x - 1)(2x - 1)$

Hence, zeroes of $f(x)$ are $\sqrt{2}, -\sqrt{2}, 1, \frac{1}{2}$

**OR**

$$
\begin{array}{r|l}
 & 2x^2 + 5 \\
3x^2 + 4x + 1 & 6x^4 + 8x^3 + 17x^2 + 21x + 7 \\
 & 6x^4 + 8x^3 + 2x^2 \\
 & - \quad - \quad - \\
\hline
 & 15x^2 + 21x + 7 \\
 & 15x^2 + 20x + 5 \\
 & - \quad - \quad - \\
\hline
 & x + 2
\end{array}
$$

Given form of remainder is $ax + b$

$\therefore \quad ax + b = x + 2$

$\Rightarrow \quad a = 1$ and $b = 2$

❖❖❖❖❖