STUDY mate
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Chapter End Test

(2019-20)

Date : _____ Duration : 45 Min. Max. Marks : 25	**Mathematics** **Topic:** Polynomials	**Class** **IX**

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. In $\frac{\pi x^2}{2} + x + 10$, the coefficient of x^2 is:

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

2. $x + \frac{1}{x}$ is:

(a) a polynomial of degree 1 (b) a polynomial of degree 2

(c) a polynomial of degree 3 (d) not a polynomial

3. The degree of polynomial 3 is:

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

4. The value of $p(t) = 2 + t + 2t^2 - 8$ for $p(2)$ is:

(a) -4 (b) 4 (c) 6 (d) 7

5. Which one of the following is the zero of $p(x) = lx + m$?

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

6. On dividing $x^3 + 3x^2 + 3x + 1$ by x, we get the remainder as:

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

7. On dividing $x^3 + 3x^2 + 3x + 1$ by $(x + \pi)$ we get the remainder as:

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

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

8. Without actually calculating the cubes the value of $28^3 + (-15)^3 + (-13)^3$ is:

(a) 17380 (b) -16380 (c) 15380 (d) 16380

9. If $x + 2$ is a factor of $x^3 + 2ax^2 + ax^{-1}$ then the value of a is:

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

10. If $x + y + z = 0$, then $x^3 + y^3 + z^3$ is:

(a) xyz (b) $-3xyz$ (c) $3xyz$ (d) $-2xy$

11. The factors of $12x^2 - 7x + 1$ are:

(a) $(4x - 1)(3x - 1)$ (b) $(4x - 1)(3x + 1)$ (c) $(4x + 1)(3x - 1)$ (d) $(4x + 1)(3x + 1)$

12. The factors of $x^3 - 2x^2 - x + 2$ are:

(a) $(x - 1)(x - 1)(x - 2)$ (b) $(x + 1)(x + 1)(x + 2)$

(c) $(x + 1)(x - 1)(x - 2)$ (d) $(x + 1)(x + 1)(x - 2)$

13. Factorisation of $x^3 + 1$ is:

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

14. If $\frac{a}{b} + \frac{b}{a} = 1$ $(a \neq 0,\ b \neq 0)$ then the value of $a^3 + b^3$ is:

(a) -1 (b) 0 (c) 1 (d) $\frac{1}{2}$

15. If $(x + 2)$ and $(x - 2)$ are factors of $ax^4 + 2x^3 - 3x^2 + bx - 4$ then the value of $a + b$ is:

(a) -7 (b) 7 (c) 14 (d) -8

Section – B

1. If $a + b + c = 9$ and $ab + bc + ca = 26$, then find $a^2 + b^2 + c^2$.

2. Factorize: $8p^3 + \frac{12}{5}p^2 + \frac{6}{25}p + \frac{1}{125}$.

3. Factorize: $x^3 + 13x^2 + 32x + 20$.

OR

If both $(x - 2)$ and $\left(x - \frac{1}{2}\right)$ are factors of $px^2 + 5x + r$, show that $p = r$.

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Hints/Solutions to Chapter End Test

(2019-20)

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Section – A

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

Section – B

1. $a + b + c = 9$

$ab + bc + ca = 26$

$a^2 + b^2 + c^2 = ?$

Using, $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

$\Rightarrow \quad (9)^2 = a^2 + b^2 + c^2 + 2(26)$

$\Rightarrow \quad 81 = a^2 + b^2 + c^2 + 52$

$\Rightarrow \quad a^2 + b^2 + c^2 = 81 - 52 = 29$

2. $8p^3 + \frac{12}{5}p^2 + \frac{6}{25}p + \frac{1}{125}$

$= (2p)^3 + 3(2p)^2\left(\frac{1}{5}\right) + 3(2p)\left(\frac{1}{5}\right)^2 + \left(\frac{1}{5}\right)^3$

Using, $a^3 + 3a^2b + 3ab^2 + b^3 = (a + b)^3$, we have

$= \left(2p + \frac{1}{5}\right)^3$

$= \left(2p + \frac{1}{5}\right)\left(2p + \frac{1}{5}\right)\left(2p + \frac{1}{5}\right).$

3. $x^3 + 13x^2 + 32x + 20$

at $x = -1$

$(-1)^3 + 13(-1)^2 + 32(-1) + 20$

$= -1 + 13 - 32 + 20$

$= 33 - 33$

$= 0$

So, $x = -1$ is a zero of given polynomial

$\Rightarrow \quad x + 1$ is a factor of given polynomial.

Now, we divide the given polynomial by $(x + 1)$

$$
\begin{array}{r|l}
x + 1 & x^2 + 12x + 20 \\
\cline{2-2}
 & x^3 + 13x^2 + 32x + 20 \\
 & x^3 + x^2 \\
 & \text{– –} \\
\cline{2-2}
 & 12x^2 + 32x + 20 \\
 & 12x^2 + 12x \\
 & \text{– –} \\
\cline{2-2}
 & 20x + 20 \\
 & 20x + 20 \\
 & \text{– –} \\
\cline{2-2}
 & 0
\end{array}
$$

Now, $x^3 + 13x^2 + 32x + 20 = (x + 1)(x^2 + 12x + 20)$

$= (x + 1)(x^2 + 2x + 10x + 20)$

$= (x + 1)(x + 2)(x + 10)$.

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