


STUDY
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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) $\frac{1}{2}$

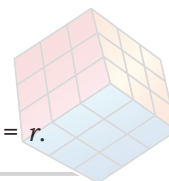
10. If $x + y + z = 0$, then $x^3 + y^3 + z^3$ is:
(a) xyz (b) $-3xyz$ (c) $3xyz$ (d) $-2xy$
11. The factors of $12x^2 - 7x + 1$ are:
(a) $(4x - 1)(3x - 1)$ (b) $(4x - 1)(3x + 1)$ (c) $(4x + 1)(3x - 1)$ (d) $(4x + 1)(3x + 1)$
12. The factors of $x^3 - 2x^2 - x + 2$ are:
(a) $(x - 1)(x - 1)(x - 2)$ (b) $(x + 1)(x + 1)(x + 2)$
(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, $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

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

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

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

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

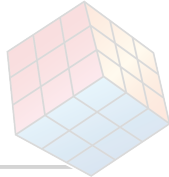
$\Rightarrow x + 1$ is a factor of given polynomial.

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

$$\begin{array}{r} x^2 + 12x + 20 \\ x + 1 \overline{) x^3 + 13x^2 + 32x + 20} \\ \underline{x^3 + x^2} \\ 12x^2 + 32x + 20 \\ \underline{12x^2 + 12x} \\ 20x + 20 \\ \underline{20x + 20} \\ 0 \end{array}$$

$$\begin{aligned}\text{Now, } x^3 + 13x^2 + 32x + 20 &= (x + 1)(x^2 + 12x + 20) \\ &= (x + 1)(x^2 + 2x + 10x + 20) \\ &= (x + 1)(x + 2)(x + 10).\end{aligned}$$



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