One Two academy | Theory of equations

Maximum Mark: 25 **Mathematics** **Time: 50 minutes**

Choose the correct answer: **3 x 1 = 3**

1. If f(x) and g(x) are polynomials of degrees m and n respectively and if h(x) = (fog)(x) then the degree of h(x) is

(a) mn (b) m+n (c) m-n (d) m/n

2. The polynomial $x^3 + 2x + 3$ has

(a) one negative and two real roots (b) one positive and two imaginary roots.

(c) three real roots (d) no solution

3. If α, β and γ are the zeros of $x^3 + px^2 + qx + r$, then $\sum \frac{1}{\alpha}$ is

(a) $-\frac{q}{r}$ (b) $-\frac{p}{r}$ (c) $\frac{q}{r}$ (d) $\frac{-q}{p}$

Answer the following: **3 x 2 = 6**

4. Determine the number of positive and negative roots of the equations

$$x^9 - 5x^8 - 14x^7 = 0.$$

5. If p, q are the roots of the equation $lx^2 + nx + n = 0$, show that $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{l}} = 0$.

6. Show that the equation $x^9 - 5x^5 + 4x^4 + 2x^2 + 1 = 0$ has atleast 6 imaginary solutions.

Answer any two of the following: **2 x 3 = 6**

7. Form a quadratic equation with integer coefficients with $\sqrt{\frac{\sqrt{2}}{\sqrt{3}}}$ as a root.

8. Prove that a straight line and a parabola cannot intersect at more than two points.

9. Solve the equation: $x^4 - 14x^2 + 45 = 0$.

Answer the following: **2 x 5 = 10**

10. Solve the following reciprocal equation: $x^4 + 3x^3 - 3x - 1 = 0$.

11. Solve the equation $9x^3 - 36x^2 + 44x - 16 = 0$ if the roots form an arithmetic progression.

OR

Solve: $(2x - 3)(x + 3)(x - 2)(2x + 3) + 20 = 0$.

All the Best

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Answer Key attached in the next page !!!

This page is to prevent seeing answer key

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Answer Key

Q.no	Solution	Marks
1.	(a) mn	**1**
2.	(a) one negative and two real roots	**1**
3.	(c) $-\frac{q}{r}$	**1**
4.	It has one positive zero and one negative zero.	**2**
5.	**Correct proof**	**2**
6.	**Correct proof**	**2**
7.	$\mathbf{3x^2 - 2 = 0}$	**3**
8.	Correct proof.	**3**
9.	$x = \pm 3 , x = \pm\sqrt{5}$	**3**
10.	$\pm 1, \frac{-3 \pm \sqrt{5}}{2}$	**5**
11.	$\mathbf{\frac{2}{3}, \frac{4}{3}, 2}$	**5**
	OR	**5**
	1,-2, $\mathbf{\frac{-1 \pm 2\sqrt{5}}{2}}$	

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