Quadratic Equations

Subjects : Maths **Previous Year Questions**

Maths - Section A (MCQ)

1. If n is a root of the equation $x^2 + px + m = 0$ and m is a root of the equation $x^2 + px + n = 0$, where $m \neq n$, then what is the value of $p + m + n$?

A) -1 **B)** 0 **C)** 1 **D)** 2

2. The roots of the equation $7x^2 - 6x + 1 = 0$ are $\tan\alpha$ and $\tan\beta$, where 2α and 2β are the angles of a triangle. Which one of the following is correct?

A) The triangle is equilateral

B) The triangle is isosceles but not right-angled

C) The triangle is right-angled

D) The triangle is right-angled isosceles

3. What is the number of real roots of the equation $(x-1)^2 + (x-3)^2 + (x-5)^2 = 0$?

A) None **B)** Only one **C)** Only two **D)** Three

4. A quadratic equation is given by $(a+b)x^2 - (a+b+c)x + k = 0$, where a, b, c are real. If $k = \frac{c}{2}, (c \neq 0)$, then the roots of the equation are:

A) Real and equal **B)** Real and unequal **C)** Real iff a > c **D)** Complex but not real

5. Consider the equation $(1-x)^4 + (5-x)^4 = 82$
What is the number of real roots of the equation?

A) 0 **B)** 2 **C)** 4 **D)** 8

6. For how many integral values of k, the equation $x^2 - 4x + k = 0$, where k is an integer, has real roots and both of them lie in the interval $(0, 5)$?

A) 3 **B)** 4 **C)** 5 **D)** 6

7. Let α and β be the roots of the equation $x^2 + px + q = 0$. If α^3 and β^3 are the roots of the equation $x^2 + mx + n = 0$, then what is the value of $m + n$?

A) $p^3 + q^3 + pq$ **B)** $p^3 + q^3 - pq$ **C)** $p^3 + q^3 + 3pq$ **D)** $p^3 + q^3 - 3pq$

8. Let α and β be the roots of the equation $x^2 - ax - bx + ab - c = 0$. What is the quadratic equation whose roots are a and b ?

A) $x^2 - \alpha x - \beta x + \alpha\beta + c = 0$

B) $x^2 - \alpha x - \beta x + \alpha\beta - c = 0$

C) $x^2 + \alpha x + \beta x + \alpha\beta + c = 0$

D) $x^2 + \alpha x + \beta x + \alpha\beta - c = 0$

9. If the roots of the equation $x^2 - ax - bx - cx + bc + ca = 0$ are equal, then which one of the following is correct?

A) $a + b + c = 0$ **B)** $a - b + c = 0$ **C)** $a + b - c = 0$ **D)** $-a + b + c = 0$

10. Let α and $\beta(\alpha > \beta)$ be the roots of the equation $x^2 - 8x + q = 0$. If $\alpha^2 - \beta^2 = 16$, then what is the value of q ?

A) -15 **B)** -10 **C)** 10 **D)** 15

11. Let $p, q(p > q)$ be the roots of the quadratic equation $x^2 + bx + c = 0$ where $c > 0$. If $p^2 + q^2 - 11pq = 0$, then what is $p - q$ equal to?

A) $3\sqrt{c}$ **B)** $3c$ **C)** $9\sqrt{c}$ **D)** $9c$

12. If $x + y = 20$ and $P = xy$, then what is the maximum value of P ?

A) 100 **B)** 96 **C)** 84 **D)** 50

13. If α and β are the roots of the equation $4x^2 + 2x - 1 = 0$, then which one of the following is correct?

A) $\beta = -2\alpha^2 - 2\alpha$ **B)** $\beta = 4\alpha^2 - 3\alpha$ **C)** $\beta = \alpha^2 - 3\alpha$ **D)** $\beta = -2\alpha^2 - 2\alpha$

14. If one root of $5x^2 + 26x + k = 0$ is reciprocal of the other, then what is the value of k ?

A) 2 **B)** 3 **C)** 5 **D)** 8

15. If k is one of the roots of the equation $x(x + 1) + 1 = 0$, then what is its other root?

A) 1 **B)** $-k$ **C)** k^2 **D)** $-k^2$

16. If the roots of the equation $4x^2 - (5k + 1)x + 5k = 0$ differ by unity, then which one of the following is a possible value of k ?

A) -3 **B)** -1 **C)** $-\frac{1}{5}$ **D)** $-\frac{3}{5}$

17. The quadratic equation $3x^2 - (k^2 + 5k)\,x + 3k^2 - 5k = 0$ has real roots of equal magnitude and opposite sign. Which one of the following is correct?

A) $0 < k < \frac{5}{3}$ **B)** $0 < k < \frac{3}{5}$ only

C) $\frac{3}{5} < k < \frac{5}{3}$ **D)** No such value of k exists

18. If $\sin\theta$ and $\cos\theta$ are the roots of the equation $ax^2 + bx + c = 0$, then which one of the following is correct?

A) $a^2 + b^2 - 2ac = 0$ **B)** $-a^2 + b^2 + 2ac = 0$

C) $a^2 - b^2 + 2ac = 0$ **D)** $a^2 + b^2 + 2ac = 0$

19. If $\cot\alpha$ and $\cot\beta$ are the roots of the equation $x^2 - 3x + 2 = 0$, then what is $\cot(\alpha + \beta)$ equal to ?

A) $\frac{1}{2}$ **B)** $\frac{1}{3}$ **C)** 2 **D)** 3

20. The roots α and β of a quadratic equation, satisfy the relations $\alpha + \beta = \alpha^2 + \beta^2$ and $\alpha\beta = \alpha^2\beta^2$. What is the number of such quadratic equations?

A) 0 **B)** 2 **C)** 3 **D)** 4

21. If $f(x) = 3x^2 - 5x + p$ and $f(0)$ and $f(1)$ are opposite in sign, then which of the following is correct?

A) $-2 < p < 0$ **B)** $-2 < p < 2$ **C)** $0 < p < 2$ **D)** $3 < p < 5$

22. What are the roots of the equation $|x^2 - x - 6| = x + 2$?

A) $-2, 1, 4$ **B)** $0, 2, 4$ **C)** $0, 1, 4$ **D)** $-2, 2, 4$

23. The number of real roots for the equation $x^2 + 9|x| + 20 = 0$ is

A) Zero **B)** One **C)** Two **D)** Three

24. Under which one of the following conditions will the quadratic equation $x^2 + mx + 2 = 0$ always have real roots?

A) $2\sqrt{3} \leq m^3 < 8$ **B)** $\sqrt{3} \leq m^2 < 4$ **C)** $m^2 > 8$ **D)** $m^2 \leq \sqrt{3}$

25. Under which one of the following conditions does the equation $(\cos\beta - 1)x^2 + (\cos\beta)x + \sin\beta = 0$ in x have a real root for $\beta \in [0, \pi]$?

A) $1 - \cos\beta < 0$ **B)** $1 - \cos\beta \leq 0$ **C)** $1 - \cos\beta > 0$ **D)** $1 - \cos\beta \geq 0$

26. If p and q are the roots of the equation $x^2 - 30x + 221 = 0$, what is the value of $p^3 + q^3$?

A) 7010 **B)** 7110 **C)** 7210 **D)** 7240

27. How many real roots does the equation $x^3 + 3|x| + 2 = 0$ have?

A) Zero **B)** One **C)** Two **D)** Four

28. If $\cot\alpha$ and $\cot\beta$ are the roots of the equation $x^2 + bx + c = 0$ with $b \neq 0$, then the value of $\cot(\alpha + \beta)$ is

A) $\frac{c-1}{b}$ **B)** $\frac{1-c}{b}$ **C)** $\frac{b}{c-1}$ **D)** $\frac{b}{1-c}$

29. If α and β are the roots of the equation $3x^2 + 2x + 1 = 0$, then the equation whose roots are $\alpha + \beta^{-1}$ and $\beta + \alpha^{-1}$ is

A) $3x^2 + 8x + 16 = 0$ **B)** $3x^2 - 8x - 16 = 0$ **C)** $3x^2 + 8x - 16 = 0$ **D)** $x^2 + 8x + 16 = 0$

30. If the roots of the equation $3ax^2 + 2bx + c = 0$ are in the ratio $2 : 3$, then which one of the following is correct?

A) $8ac = 25b$ **B)** $8ac = 9b^2$ **C)** $8b^2 = 9ac$ **D)** $8b^2 = 25ac$

Quadratic Equations

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Maths - Section A (MCQ)

1 - C	2 - C	3 - A	4 - B	5 - B	6 - B	7 - D	8 - A	9 - C	10 - D
11 - A	12 - A	13 - A	14 - C	15 - C	16 - C	17 - D	18 - C	19 - B	20 - B
21 - C	22 - D	23 - A	24 - C	25 - B	26 - B	27 - A	28 - B	29 - A	30 - D