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Class: 11
Subject: Math's
Topic: Quadratic Equations
No. of Questions: 25

1. The number of solutions of $\sqrt{4-x}+\sqrt{x+9}=5$ is

A. 0
B. 1
C. 2
D. 3

2. The value of a for which one root of the quadratic equation, $(a^2 - 5a + 3)\,x^2 + (3a - 1)x + 2 = 0$ is twice as large as other, is

A. 2/3
B. 1/3
C. 1/3
D. 2/3

3. If $f(x) = x^2 + 2bx + 2c^2$ and $g(x) = -x^2 - 2cx + b^2$ are such that min f(x) > max g(x), then the relation between b and c, is

A. no relation
B. $0 < c < b/2$
C. $|c| < \frac{|b|}{\sqrt{2}}$
D. $|c| > \sqrt{2}|b|$

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4. Let p and q be the roots of $x^2 - 2x + A = 0$ and let r and s be the roots of $x^2 - 18x + B = 0$. If $p < q < r < s$ are in an A.P. then the ordered pair (A, B) is equal to

A. (– 3, 77)
B. (77, – 3)
C. (– 3, – 77)
D. None of these

5. Suppose a, b, c are three non-zero real numbers. The equation $x^2 + (a + b + c)x + (a^2 + b^2 + c^2) =$

0 has

A. two negative real roots
B. two positive real roots
C. two real roots with opposite signs
D. no real roots

6. The equation $(\cos p - 1)x^2 + (\cos p)x + \sin p = 0$ in variable x has real roots, if p belongs to the interval

A. $(0, 2\pi)$
B. $(-\pi, 0)$
C. $(-\pi/2, \pi/2)$
D. $(0, \pi)$

7. If a, b are two real numbers satisfying the relations $2a^2 - 3a - 1 = 0$ and $b^2 + 3b - 2 = 0$ and $ab \neq 1$, then the value of $\frac{ab + a + 1}{b}$ is

A. 1
B. 0
C. 1
D. 2

8. Suppose a, b, c are the lengths of three sides of a ΔABC, a > b > c, 2b = a + c and b is a positive integer. If $a^2 + b^2 + c^2 = 84$, then the value of b is

A. 7
B. 6
C. 5
D. 4

9. Let p and q be real numbers such that $p \neq 0$, $p^3 \neq q$ and $p^3 \neq -q$. If α and β are non-zero complex numbers satisfying $\alpha + \beta = -p$ and $\alpha^3 + \beta^3 = q$, then a quadratic equation having $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ as its roots is

A. $(p^3 + q)x^2 - (p^3 + 2q)x + (p^3 + q) = 0$
B. $(p^3 + q)x^2 - (p^3 - 2q)x + (p^3 + q) = 0$
C. $(p^3 - q)x^2 - (5p^3 - 2q)x + (p^3 - q) = 0$
D. $(p^3 - q)x^2 - (5p^3 + 2q)x + (p^3 - q) = 0$

10. If a is the minimum root of the equation $x^2 - 3|x| - 2 = 0$, then the value of $-1/a$ is

A. $(\sqrt{17} - 3)/4$
B. $(\sqrt{17} + 3)/4$
C. 2
D. 3

11. Let α, β be the roots of $x^2 - x + p = 0$ and γ, δ be the roots of $x^2 - 4x + q = 0$. If $\alpha, \beta, \gamma, \delta$ are in a G.P. then the integral values of p and q respectively, are

A. 2, – 32
B. 2, 3
C. 6, 3
D. 6, – 32

12. If α and β ($\alpha < \beta$) are the roots of the equation $x^2 + bx + c = 0$, where $c < 0 < b$, then

A. $0 < \alpha < \beta$
B. $\alpha < 0 < \beta < |\alpha|$
C. $\alpha < \beta < 0$
D. $\alpha < 0 < |\alpha| < \beta$

13. If the roots of the equation $x^2 - 2ax + a^2 + a - 3 = 0$ are real and less than 3, then

A. $a < 2$
B. $2 \leq a \leq 3$
C. $3 < a \leq 4$
D. $a > 4$

14. If $4^x - 3^{x-1/2} = 3^{x+1/2} - 2^{2x-1}$, then the value of x is equal to

A. 5/2
B. 2
C. 3/2
D. 1

15. The number of solutions of $\sqrt{x+1} - \sqrt{x-1} = 1$, ($x \in R$) is

A. 1
B. 2
C. 4
D. Infinite

16. The equation $\sqrt{x+1} - \sqrt{x-1} = \sqrt{4x-1}, (x \in R)$ has

A. no solution
B. one solution
C. two solutions
D. more than two solutions

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17. If c, d are roots of $x^2 - 10ax - 11b = 0$ and a, b are roots of $x^2 - 10cx - 11d = 0$, then the value of $a + b + c + d$ is

A. 1210
B. 1
C. 2530
D. 11

18. If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$, is equal to the sum of the squares of their reciprocals, then

A. ab^2, ca^2, bc^2 are in A.P.
B. ab^2, bc^2, ca^2 are in A.P.
C. ab^2, bc^2, ca^2 are in G.P.
D. none of these

19. If a and b are the non-zero distinct roots of $x^2 + ax + b = 0$, then the least value of $x^2 + ax + b$ is

A. 2/3
B. 9/4
C. 9/4
D. 1

20. If $a < b < c < d$, then the equation $3(x - a)(x - c) + 5(x - b)(x - d) = 0$ has

A. real and distinct roots
B. real and equal roots
C. purely imaginary roots
D. none of these

21. Convert in the polar form $\frac{1+7i}{(2-i)^2}$

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22. Find the real values of x and y if (x - iy) (3 + 5i) is the conjugate of – 6 – 24i

23. If $|z_1| = |z_2| = 1$, *prove that* $\left|\frac{1}{z_1} + \frac{1}{z_2}\right| = |z_1 + z_2|$

24. If α and β are different complex number with $|\beta| = 1$ then find $\left|\frac{\beta - \alpha}{1 - \overline{\alpha}\beta}\right|$

25. If $\alpha + ib = \frac{(x+i)^2}{2x-i}$ prove that $a^2 + b^2 = \frac{(x^2+1)^2}{4x^2+1}$