MATHS

BOOKS - MTG WBJEE MATHS (HINGLISH)

QUADRATIC EQUATIONS

Wb Jee Workout Single Option Correct Type

1. Maximum value of $6 + 4x - 4x^2$ is

A. 6

B. 7

C. 2

D. 3

Answer: a

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2. The roots of the equation

$(a+c-b)x^2-2cx+(b+c-a)=0$ are

A. $1, \dfrac{2c}{a+c-b}$

B. $1, \dfrac{b+c-a}{a+c-b}$

C. $1, \dfrac{b+c-a}{2c}$

D. $1, \dfrac{a+c-b}{b+c-a}$

Answer: b

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3. If the roots of $(b-c)x^2+(c-a)x+(a-b)=0$ are equal, then $a+c=$

A. 2b

B. b^2

C. 3b

D. b

Answer: a

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4. If the two equations a $a_1x^2 + b_1x + c_1 = 0$ and $a_2x^2 + b_2x + c_2 = 0$ have a common root, then the value of $(a_1b_2 - a_2b_1)(b_1c_2 - b_2c_1)$ is

A. $-(a_1c_2 - a_2c_1)^2$

B. $(a_1a_2 - c_1c_2)^2$

C. $(a_1c_1 - a_2c_2)^2$

D. $(a_1c_2 - a_2c_1)^2$

Answer: d

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5. If $f(x) = 2x^3 + mx^2 - 13x + n$ are 2, 3 roots of the equation f(x)=0, then the value of m and n are

A. $-5, \ -30$

B. $-5, 30$

C. $5, 30$

D. None of these

Answer: b

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6. If $7^{\log_7 (x^2 - 4x + 5)} = x - 1$, then x may have values

A. 2, 3

B. 7

C. $-2, \ -3$

D. $2, -3$

Answer: a

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7. Roots of the equations $2x^2 - 5x + 1 = 0$ and $x^2 + 5x + 2 = 0$ are

A. Reciprocal and of the same sign

B. Reciprocal and of opposite sign

C. Equal in magnitude

D. None of these

Answer: b

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8. If one root of $x^2 + px + q = 0$ is twice the other, then the value of q in terms of p is

A. $\frac{p^2}{5}$

B. $\frac{2p^2}{3}$

C. $\frac{2p^2}{9}$

D. None of these

Answer: c

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9. If the roots of $x^2 + px + 12 = 0$ are in the ratio $1:3$, then p =

A. ± 9

B. ± 3

C. ± 6

D. ± 8

Answer: d

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10. If the roots of $x^2 - bx + c = 0$ are two consecutive integers then $b^2 - 4c =$

A. 0

B. 1

C. 2

D. None of these

Answer: b

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11. For the equation $\left|x^2\right| + |x| - 6 = 0$, the roots are

A. One and only one real number

B. Real with sum one

C. Real with sum zero

D. Real with product zero

Answer: c

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12. The number of solutions of $\frac{\log 5 + \log\left(x^2 + 1\right)}{\log(x - 2)} = 2$ is

A. 2

B. 3

C. 1

D. None of these

Answer: d

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13. If a, b, c, ..., k are roots of the equation f(x) = 0, then the value of $\frac{f(x)}{x-a}+\frac{f(x)}{x-b}+\ldots+\frac{f(x)}{x-k}$ is

A. 2

B. 0

C. 1

D. None of these

Answer: d

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14. Let $f(x)=x^2-3x+4$, the value of x which satisfies $f(1)+f(x)=f(1)f(x)$ is

A. 1

B. 2

C. 1 and 2

D. 1 and 0

Answer: c

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

A. $z^2 + z + 1 = 0$

B. $z^2 - 7z + 1 = 0$

C. $z^2 + 7z + 1 = 0$

D. $z^2 + 7z - 1 = 0$

Answer: b

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16. Let a, b and c bereal numbers such that 4a+2b+c=0 and ab $>$ 0. Then the quadratic equation $ax^2 + bx + c = 0$ has

A. real roots

B. complex roots

C. purely imaginary roots

D. only one root

Answer: a

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17. If a, b, c, d, x are distinct non zero real numbers such that $\left(a^2 + b^2 + c^2\right)x^2 - 2(ab + bc + cd)x + \left(b^2 + c^2 + d^2\right) \leq 0$, then a, b, c, d are in

A. A.P.

B. H.P.

C. G.P.

D. None of these

Answer: c

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18. If α, β, γ are roots of $x^3 + 4x + 1 = 0$, then $(\alpha + \beta)^{-1} + (\beta + \gamma)^{-1} + (\gamma + \alpha)^{-1}$ equals

A. 2

B. 3

C. 4

D. 5

Answer: c

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19. If the sum of two roots of the equation $x^3 + ax^2 + bx + c = 0$ is zero, then the value of ab equals

A. c

B. 2c

C. $-2c$

D. $-c$

Answer: a

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20. If a, b, c are real numbers in A.P., then the roots of $ax^2 + bx + c = 0$ are real for

A. all a and c

B. no a and c

C. $\left|\frac{c}{a} - 7\right| \geq 4\sqrt{7}$

D. $\left|\frac{a}{c}+7\right| \geq 2\sqrt{3}$

Answer: c

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21. Let α and β be the roots of equation $x^2-6x-2=0$ if $a_n=\alpha^n-\beta^n$, for $n \geq 1$, then the value of $\frac{a_{10}-2a_8}{2a_9}$ is equal to

A. 3

B. -3

C. 6

D. -6

Answer: a

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22. The set of value of x for which the inequality $[x]^2 - 5[x] + 6 \leq 0$ (where [.] denote the greatest integral function) hold good if

A. $2 \leq [x] < 3$

B. $2 \leq x < 4$

C. $2 \leq [x] \leq 3$

D. (b) and (c) both

Answer: c

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23. If roots of the equation $x^2 + \alpha^2 = 8x + 6\alpha$ are real, then which one is correct?

A. $-2 \leq \alpha \leq 8$

B. $2 \leq \alpha \leq 8$

C. $-2 < \alpha \leq 8$

D. $-2 \leq \alpha < 8$

Answer: a

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24. If x and 'a' are real, then the value of 'a' for which $x^2 - \frac{3ax}{2} + 1 - a^2$ is positive is

A. $-\frac{4}{25}p$

B. $\frac{4}{25}$

C. $|a| > \frac{4}{5}$

D. $|a| < \frac{4}{5}$

Answer: d

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25. The equation $x^2 - 3|x| + 2 = 0$ has

A. no real root

B. one real root

C. two real roots

D. four real roots

Answer: d

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26. The sum of all real roots of the equation $|x-2|^2 + |x-2| - 2 = 0$ is

A. 7

B. 4

C. 1

D. 5

Answer: b

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27. If a, b, c are real, then both the roots of the equation $(x-b)(x-c)+(x-c)(x-a)+(x-a)(x-b)=0$ are always

A. positive

B. negative

C. real

D. imaginary

Answer: c

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28. The roots of the quadratic equation $x^2-2\sqrt{3}x-22=0$ are

A. imaginary

B. real, rational and equal

C. real, irrational and unequal

D. real, rational and unequal

Answer: c

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29. The equations $x^2 + x + a = 0$ and $x^2 + ax + 1 = 0$ have a common real root

A. for no value of a

B. for exactly one value of a

C. for exactly two values of a

D. for exactly three values of a

Answer: b

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30. The quadratic equation $2x^2 - \left(a^3 + 8a - 1\right)x + a^2 - 4a = 0$ possesses roots of opposite sign. Then

A. $a \leq 0$

B. $0 < a < 4$

C. $4 \leq a < 8$

D. $a \geq 8$

Answer: b

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31. The condition that the roots of $px^2 - px + q = 0$ are in the ratio $p : q$ is $[q \neq 0, p \neq 0]$

A. $p + q = 0$

B. $2p - q = 0$

C. $2p + q = 0$

D. None of these

Answer: c

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32. If the roots of $ax^2 + ax + c = 0$ are in the ratio p : q, then $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} = 0$

A. $\sqrt{\frac{a^2}{c}}$

B. $\sqrt{\frac{a}{2c}}$

C. $\sqrt{\frac{a}{c}}$

D. None of these

Answer: c

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33. If the equation $\frac{x^2 - bx}{ax - c} = \frac{m - 1}{m + 1}$ has roots equal in magnitude but opposite in sign, then m equals

A. $\frac{a + b}{a - b}$

B. $\frac{a - b}{a + b}$

C. $\frac{b - a}{b + a}$

D. None of these

Answer: b

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34. The set of value ofp for which the roots of the equation $3x^2 + 2x + p(p - 1) = 0$ are of opposite signs is

A. $(- \infty, 0)$

B. $(0, 1)$

C. $(1, \infty)$

D. $(0, \infty)$

Answer: b

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35. Let α, β be the roots of $ax^2 + bx + c = 0$ and γ, δ be the roots of $px^2 + qx + r = 0$ and D_1, D_2 be the discriminants respectively. If $\alpha, \beta, \gamma, \delta$ are in A.P., then $D_1 : D_2$ is

A. $\frac{a^2}{b^2}$

B. $\frac{a^2}{p^2}$

C. $\frac{b^2}{q^2}$

D. $\frac{c^2}{r^2}$

Answer: b

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36. Given that, for all real x, the expression $\frac{x^2-2x+4}{x^2+2x+4}$ lies between $\frac{1}{3}$ and 3. The values which the expansion $\frac{9\cdot 3^{2x}+6\cdot 3^x+4}{9\cdot 3^{2x}-6\cdot 3^x+4}$ lies are

A. $\frac{1}{3}$ and 3

B. -2 and 0

C. -1 and 1

D. 0 and 2

Answer: a

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37. If every pair from among the equations $x^2+px+qr=0, x^2+qx+rp=0$ and $x^2+rx+pq=0$ has a common root, then the sum of the three common roots is

A. $2(p+q+r)$

B. $p+q+r$

C. $-(p+q+r)$

D. pqr

Answer: b

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38. If $\sin\alpha$ and $\cos\alpha$ are the roots of the equation $px^2+qx+r=0$, then

A. $p^2-q^2+2pr=0$

B. $(p+r)^2=q^2-r^2$

C. $p^2+q^2-2pr=0$

D. $(p-r)^2=q^2+r^2$

Answer: a

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39. The solution of the equation $(3|x|-3)^2=|x|+7$ which belongs to the domain of definition of the function $y=\sqrt{x(x-3)}$ are given by

A. $\pm\frac{1}{9},\ \pm 2$

B. $-\frac{1}{9}, 2$

C. $\frac{1}{9},\ -2$

D. $-\frac{1}{9},\ -2$

Answer: d

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40. Let α and β be the roots of the equation $x^2+x+1=0$. The equation whose roots are α^{19}, β^7 is

A. $x^2-x-1=0$

B. $x^2-x+1=0$

C. $x^2 + x - 1 = 0$

D. $x^2 + x + 1 = 0$

Answer: d

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41. If rational a, b, c, d are in G.P., then roots of equation $(a-c)^2x^2 + (b-c)^2x + (b-d)^2 = (a-d)^2$ are necessarily

A. Imaginary

B. Irrational

C. rational

D. real and distinct

Answer: c

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42. If a, b, c be the p^{th}, q^{th} and r^{th} terms respectively of an A.P. and G.P. both, then the product of the roots of equation $\left(a^b b^c c^a\right)x^2 - (abc)x + \left(a^c b^a c^b\right) = 0$ equals

A. -1

B. 2

C. abc

D. 1

Answer: d

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43. If α, β are roots of the equation $x^2 - p(x+1) - q = 0$, the value of $\frac{\alpha^2 + 2\alpha + 1}{\alpha^2 + 2\alpha + q} + \frac{\beta^2 + 2\beta + 1}{\beta^2 + 2\beta + q}$ is

A. 0

B. 2

C. 1

D. -1

Answer: c

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

A. $2/3$

B. $1/3$

C. $-2/3$

D. $-1/3$

Answer: a

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45. If m is chosen in the quadratic equation $(m^2+1)x^2-3x+(m^2+1)^2=0$ such that the sum of its roots is greatest, then the absolute difference of the cubes of its roots is

A. $4\sqrt{3}$

B. $10\sqrt{5}$

C. $8\sqrt{5}$

D. $8\sqrt{3}$

Answer: c

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Wb Jee Workout One Or More Than One Option Correct Type

1. The ratio of the roots of the equation $ax^2+bx+c=0$ is same as the ratio of the roots of the equation $px^2+qx+r=0$. If D_1 and D_2 are

discriminants of $ax^2 + bx + c = 0$ and $px^2 + qx + r = 0$ respectively, then $D_1 : D_2 =$

A. $\frac{a^2}{p^2}$

B. $\frac{b^2}{q^2}$

C. $\frac{c^2}{r^2}$

D. None of these

Answer: b

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2. The set of values of x which satisfy $5x + 2 < 3x + 8$ and $\frac{x+2}{x-1} < 4$ is

A. $(2, 3)$

B. $(-\infty, 1) \cup (2, 3)$

C. $(-\infty, 1)$

D. $(1, 3)$

Answer: b

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3. Let $f(x) = x^2 + 4x + 1$. Then

A. $f(x) > 0$ for all x

B. $f(x) > 1$ when $x \geq 0$

C. $f(x) \geq 1$ when $x \leq -4$

D. $f(x) = f(-x)$ for all x.

Answer: c

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4. The roots of the equation $ax^3 + bx^2 + cx + d = 0$, are $\alpha_1, \alpha_2, \alpha_3$ and roots of $g(z) = az^3 + \frac{f''(y)z^2}{2!} + \frac{f'(y)}{1!}z + f(y) = 0$ are $\beta_1, \beta_2, \beta_3$, then $\alpha_1 - \beta_1$ equals

A. $\alpha_2 - \beta_2$

B. $\alpha_3 - \beta_3$

C. y

D. All of these

Answer: d

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5. The value of P for which both the roots of the equation $4x^2 - 20Px + \left(25P^2 + 15P - 66\right) = 0$ are less than 2, lies in

A. $\left(\frac{4}{5}, 2\right)$

B. $(2, \infty)$

C. $\left(-1, \frac{4}{5}\right)$

D. $(-\infty, -1)$

Answer: d

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6. If b be the p^{th} term of G.P. where $(p+q)^{th}$ and $(p-)^{th}$ terms are a and c respectively and if $f(x) = ax^2 + 2bx + c$, then for all $x \in R$

A. $af(x) = 0$

B. $D = 0$

C. $af(x) \leq 0$

D. None of these

Answer: b

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7. Let a, b, c be real number $(a \neq 0)$. If α is a root of $a^2x^2 + bx + c = 0$, β is a root of $a^2x^2 - bx - c = 0$ and $0 < \alpha\beta$, then the root of the equation (say γ) $a^2x^2 + 2bx + 2c = 0$ always satisfies

A. $\gamma = \frac{\alpha + \beta}{2}$

B. $f(\gamma) = 0$

C. $\gamma = \alpha$

D. $\alpha < \gamma < \beta$

Answer: b,d

View Text Solution

8. The equation x

A. Exactly three roots (real)

B. At least one real root

C. Exactly one irrational root

D. Exactly one rational root

Answer: a,b,c

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9. The value of x satisfying the equation

$|x-1|^{\log_3 x^2 - 2\log_x 9} = (x-1)^7$ is

A. 27

B. 81

C. 9

D. $1/\sqrt{3}$

Answer: b

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10. Let $a = e^{i\frac{2\pi}{13}}$ then the quadratic equation whose roots are $\alpha = a + a^3 + a^4 + a^{-4} + a^{-3} + a^{-1}, \beta = a^2 + a^5 + a^6 + a^{-6} + a^{-5} +$ is given by

A. $x^2 - x - 3 = 0$

B. $x^2 - x + 2 = 0$

C. $x^2 + x + 2 = 0$

D. $x^2 + x - 3 = 0$

Answer: d

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Wb Jee Previous Years Questions Single Option Correct Type

1. If α and β are the roots of $x^2 - x + 1 = 0$ then the value of $\alpha^{2013} + \beta^{2013}$ is equal to

A. 2

B. -2

C. -1

D. 1

Answer: b

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2. If α, β are the roots of the quadratic equation $x^2 + ax + b = 0, (b \neq 0)$, then the quadratic equation whose roots are $\alpha - \frac{1}{\beta}, \beta - \frac{1}{\alpha}$ is

A. $ax^2 + a(b-1)x + (a-1)^2 = 0$

B. $bx^2 + a(b-1)x + (b-1)^2 = 0$

C. $x^2 + ax + b = 0$

D. $abx^2 + bx + a = 0$

Answer: b

View Text Solution

3. If α, β are the roots of the quadratic equation $ax^2 + bx + c = 0$ and $3b^2 = 16ac$, then

A. $\alpha = 4\beta$ or $\beta = 4\alpha$

B. $\alpha = -4\beta$ or $\beta = -4\alpha$

C. $\alpha = 3\beta$ or $\beta = 3\alpha$

D. $\alpha = -3\beta$ or $\beta = -3\alpha$

Answer: c

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4. If α, β are the roots of the quadratic equation $x^2 + px + q = 0$, then the values of $\alpha^3 + \beta^3$ and $\alpha^4 + \alpha^2\beta^2 + \beta^4$ are

A. $3pq - p^3$ and $p^4 - 3p^2q + 3q^2$

B. $-p(3q - p^2)$ and $(p^2 - q)(p^2 + 3q)$

C. $pq - 4$ and $p^4 - q^4$

D. $3pq - p^3$ and $(p^2 - q)(p^2 - 3q)$

Answer: d

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5. Let p, q be real numbers. If α is the root of $x^2 + 3p^2x + 5q^2 = 0$, β is a root of $x^2 + 9p^2x + 15q^2 = 0$ and $0 < \alpha < \beta$, then the equation $x^2 + 6p^2x + 10q^2 = 0$ has a root γ that always satisfies

A. $\gamma = \alpha/4 + \beta$

B. $\beta < \gamma$

C. $\gamma = \alpha/2 + \beta$

D. $\alpha < \gamma < \beta$

Answer: d

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6. If α, β are the roots of $ax^2 + bx + c = 0(a \neq 0)$ and $\alpha + h, \beta + h$ are the roots of $px^2 + qx + r = 0(p \neq 0)$ then the ratio of the squares of their discriminants is

A. $a^2 : p^2$

B. $a : p^2$

C. $a^2 : p$

D. $a : 2p$

Answer: None of the option is correct

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7. The number of solution(s) of the equation $\sqrt{x+1} - \sqrt{x-1} = \sqrt{4x-1}$ is/are

A. 2

B. 0

C. 3

D. 1

Answer: b

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8. If α, β are the roots of $x^2 - px + 1 = 0$ and γ is a root of $x^2 + px + 1 = 0$, then $(\alpha + \gamma)(\beta + \gamma)$ is

A. 0

B. 1

C. -1

D. p

Answer: a

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9. The quadratic expression $(2x+1)^2 - px + q \neq 0$ for any real x if

A. $p^2 - 16p - 8q < 0$

B. $p^2 - 8p + 16q < 0$

C. $p^2 - 8p - 16q < 0$

D. $p^2 - 16p + 8q < 0$

Answer: c

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10. Given that x is a real number satisfying $\frac{5x^2 - 26x + 5}{3x^2 - 10x + 3} < 0$, then

A. $x < \frac{1}{5}$

B. $\frac{1}{5} < x < 3$

C. $x > 5$

D. $\frac{1}{5} < x < \frac{1}{3}$ or $3 < x < 5$

Answer: d

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11. Let $x_1, x_2, \ldots, x_{15}$ be 15 distinct numbers chosen from 1, 2, 3, ..., 15. Then the value of $(x_1 - 1)(x_2 - 1)(x_3 - 1)\ldots(x_{15} - 1)$ is

A. always ≤ 0

B. 0

C. always even

D. always odd

Answer: b

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12. Let P(x) be a polynomial, which when divided by $x - 3$ and $x - 5$ leaves remainders 10 and 6 respectively. If the polynomial is divided by

$(x-3)(x-5)$, then the remainder is

A. $-2x+16$

B. 16

C. $2x-16$

D. 60

Answer: a

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13. If p, q are the roots of the equation $x^2+px+q=0$, then

A. p = 1, q = -2

B. p = 0, q = 1

C. p = -2, q = 0

D. p = -2, q = 1

Answer: a

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14. The number of values of k for which the equation $x^2 - 3x + k = 0$ has two distinct roots lying in the interval (0, 1) are interval (0, 1) are

A. three

B. two

C. infinitely many

D. no value of k satisfies the requirement

Answer: c

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15. If p, q are odd integers, then the roots of the equation $2px^2 + (2p + q)x + q = 0$ are

A. rational

B. irrational

C. non-real

D. equal

Answer: a

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16. If $b_1 b_2 = 2(c_1 + c_2)$ and b_1, b_2, c_1, c_2 are all real numbers, then at least one of the equations $x^2 + b_1 x + c_1 = 0$ and $x^2 + b_2 x + c_2 = 0$ has

A. real roots

B. purely imaginary roots

C. roots of the form $a + ib (a, b \in R, ab \neq 0)$

D. rational roots

Answer: a

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17. Let a, b, c be real numbers such that $a+b+c<0$ and the quadratic equation $ax^2+bx+c=0$ has imaginary roots. Then

A. $a>0, c>0$

B. $a>0, c<0$

C. $a<0, c>0$

D. $a<0, c<0$

Answer: d

View Text Solution

18. Let α, β be two distinct roots of $a\cos\theta+b\sin\theta=c$, where a, b and c are three real constants and $\theta\in[0, 2\pi]$. Then $\alpha+\beta$ is also a root of the same equation, if

A. $a + b = c$

B. $b + c = a$

C. $c + a = b$

D. $c = a$

Answer: d

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19. If α and β are roots of $ax^2 + bx + c = 0$ then the equation whose roots are α^2 and β^2 is

A. $a^2x^2 - (b^2 - 2ac)x + c^2 = 0$

B. $a^2x^2 + (b^2 - 2ac)x + c^2 = 0$

C. $a^2x^2 + (b^2 + ac)x + c^2 = 0$

D. $a^2x^2 + (b^2 + 2ac)x + c^2 = 0$

Answer: a

View Text Solution

20. For real x, the greatest value of $\frac{x^2+2x+4}{2x^2+4x+9}$ is

A. 1

B. -1

C. $\frac{1}{2}$

D. $\frac{1}{4}$

Answer: c

View Text Solution

21. Let $f(x) = x^4 - 4x^3 + 4x^2 + c, c \in R$. Then

A. f(x) has infinitely many zeros in (1, 2) for all c

B. f(x) has exactly one zero in (1, 2) if $-1 < c < 0$

C. f(x) has double zeros in (1, 2) if $-1 < c < 0$

D. whatever be the value of c,f(x) has no zero in (1,2)

Answer: b

View Text Solution

22. The graphs of the polynomial $x^2 - 1$ and cos x intersect

A. at exactly two points

B. at exactly 3 points

C. at least 4 but at finitely many points

D. at infinitely many points

Answer: a

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Wb Jee Previous Years Questions One Or More Than One Option Correct Type

1. Let $\sin\alpha, \cos\alpha$ be the roots of the equation $x^2 - bx + c = 0$. Then which of the following statements is/are correct?

A. $c \leq \frac{1}{2}$

B. $b \leq \sqrt{2}$

C. $c > \frac{1}{2}$

D. $b > \sqrt{2}$

Answer: a,b

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2. Which of the following is/are always false?

A. A quadratic equation with rational coefficients has zero or two irrational roots.

B. A quadratic equation with real coefficients has zero or two non-real roots.

C. A quadratic equation with irrational coefficients has zero or two rational roots.

D. A quadratic equation with integer coefficients has zero or two irrational roots.

Answer: c

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3. If the equation $x^2 + y^2 - 10x + 21 = 0$ has real roots $x = \alpha$ and $y = \beta$, then

A. $3 \leq x \leq 7$

B. $3 \leq y \leq 7$

C. $-2 \leq y \leq 2$

D. $-2 \leq x \leq 2$

Answer: a,c

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4. If a, b $\in$ {1, 2, 3} and the equation $ax^2 + bx + 1 = 0$ has real roots, then

A. $a > b$

B. $a \leq b$

C. number of possible ordered pairs of (a, b) are 3

D. $a < b$

Answer: c,d

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5. If the equation $x^2 - cx + d = 0$ has roots equal to the fourth powers of the roots of $x^2 + ax + b = 0$, where $a^2 > 4b$, then the roots of $x^2 - 4bx + 2b^2 - c = 0$ will be

A. both real

B. both negative

C. both positive

D. one positive and one negative

Answer: a,d

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6. Let $a = \min\{x^2 + 2x + 3 : x \in R\}$ and $b = \lim_{\theta \to 0} \frac{1 - \cos\theta}{\theta^2}$.

Then $\sum_{r=0}^{n} a^r b^{n-r}$ is

A. $\frac{2^{n+1} - 1}{3 \cdot 2^n}$

B. $\frac{2^{n+1} + 1}{3 \cdot 2^n}$

C. $\frac{4^{n+1} - 1}{3 \cdot 2^n}$

D. $\frac{1}{2}(2^n - 1)$

Answer: c

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7. Let x_1, x_2 be the roots of $x^2 - 3x + a = 0$ and x_3, x_4 be the roots of $x^2 - 12x + b = 0$. If $x_1 < x_2 < x_3 < x_4$ and x_1, x_2, x_3, x_4 are in G.P., then ab equals

A. $\frac{24}{5}$

B. 64

C. 16

D. 8

Answer: b

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