ALGEBRA ASSIGNMENT 3 – QUADRATIC EQUATION 1

1) The value of a for which the sum of the squares of the roots of the equation $x^2 - (a-2)x - a - 1 = 0$ Assume the least value is?
(a) 0 (b) 1 (c) 2 (d) None of these.

2) If the roots of the equation $x^2 - bx + c = 0$ be two consecutive integers, then $b^2 - 4c$ equals-
(a) 1 (b) 2 (c) -2 (d) None of these.

3) If both the roots of the quadratic equation $x^2 - 2kx + k^2 + k - 5 = 0$ are less than 5, then k lies in the interval
(a) (5,6) (b) (6,∞) (c) (∞,4) (d) None of these

4) Let two numbers have arithmetic mean 9 and geometric mean 4. Then these numbers are the roots of the quadratic equation.
(a) $x^2 + 18x + 16 = 0$ (b) $x^2 - 18x + 16 = 0$
(c) $x^2 + 18x - 16 = 0$ (d) None of these

5) If (1-p) is a root of quadratic equation $x^2 + px + (1-p) = 0$, then the roots are
(a) 0,1 (b) -1,1 (c) 0,-1 (d) None of these

6) If one root of the equation $x^2 + px + 12 = 0$ is 4, while the equation $x^2 + px + q = 0$ has equal roots, then the value of q is
(a) $\frac{49}{4}$ (b) 12 (c) 3 (d) None of these

7) The number of real solutions of the equation $x^2 - 3|x| + 2 = 0$ is
(a) 1 (b) 2 (c) 3 (d) None of these

8) The value of 'a' for which one root of quadratic equation $(a^2 - 5a + 3)x^2 + (3a - 1)x + 2 = 0$ Is twice as large as the other is
(a) $\frac{2}{3}$ (b) $-\frac{2}{3}$ (c) $\frac{1}{3}$ (d) $-\frac{1}{3}$

9) If roots of the equation $x^2 - 5x + 16 = 0\ are\ \propto, \beta$ and roots of the equation $x^2 + px + q = 0\ are\ \propto^2 + \beta^2\ and\ \frac{\propto\beta}{2}, then$
(a) p=1 and q= -56 (c) p=-1 and q= -56
(b) p=1 and q= 56 (d) None of these

10) If $\propto and\ \beta$ be the roots of the equation (x-a)(x-b)=c , c≠0, then the roots of the equation (x-∝)(x- β)=c are

(a) a and b
(b) b and c
(c) (a+b) and (b+c)
(d) None of these

11) If one root of the equation $x^2 + px - q = 0$ is square of the other, then for any p and q it will satisfy the relation
(a) $p^3 - q(3p - 1) + q^2 = 0$
(b) $p^3 - q(3p + 1) + q^2 = 0$
(c) $p^3 + q(3p - 1) + q^2 = 0$
(d) None of these.

12) If $x^2 + 2ax + 10 - 3a > 0$ for every real value of x, then
(a) a>5
(b) 2<a<5
(c) a< -5
(d) None of these

13) If minimum value of f(x) = $x^2 + 2bx + 2c^2$ is greater than the maximum value of g(x) = $-x^2 + 2cx + b^2, then\ for\ real\ value\ of\ x$
(a) |c|> $\sqrt{2}$|b|
(b) |c|*$\sqrt{2}$ > |b|
(c) 0 < c <$\sqrt{2}$|b|
(d) None of these.

14) The set of all real numbers x for which $x^2 - |x + 2| + x > 0, is$
(a) $(-\infty, -2)$ U $(2, \infty)$
(b) $(-\infty, -1)$ U $(1, \infty)$
(c) $(-\infty, -\sqrt{2})$ U $(\sqrt{2}, \infty)$
(d) None of these

15) The number of solutions of $\log_4(x-1) = \log_2(x-3)$ is
(a) 3 (b) 2 (c) 1 (d) None of these

16) If α and β are the roots if the equation $x^2 + bx + c = 0$, where c < 0 < b, then
(a) 0 < α < β (b) α < 0 < β < |α| (c) α < β <0 (d) None of these

17) For the equation $3x^2 + px + 3 = 0$, p>0, if one of the roots is square of the other,then p is equal to
(a) $\frac{1}{3}$ (b) 1 (c) 3 (d) $\frac{2}{3}$

18) If b>a,then the equation (x-a)(x-b)-1 = 0 has
(a) Both the roots in (a,b)

(b) One root in (-∞,a) and the other in (b, +∞)
(c) Both roots in (b,+∞)
(d) None of these

19) The harmonic mean of the roots of the equation
$(5+\sqrt{2})x^2 - (4+\sqrt{5})x + 8 + 2\sqrt{5} = 0$ is
(a) 2 (b) 4 (c) 6 (d) None of these.

20) 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) None of these

21) The equation $\sqrt{x+1} - \sqrt{x-1} = \sqrt{4x-1}$ has
(a) No solution (b) one solution (c) Two solutions (d) None of these

22) If p,q,r are positive and are in A.P. then the roots of the quadratic equation $px^2 + qx + r = 0$ are real for
(a) $|\frac{r}{p} - 7| \geq 4\sqrt{3}$
(b) $|\frac{p}{r} - 7| \geq 4\sqrt{3}$
(c) For all p and r
(d) None of these

23) Let f(x) be a quadratic expression which is positive for all real x.
If g(x) = f(x) + f '(x) + f "(x), then for any real x
(a) g(x) < 0 (b) g(x) > 0 (c) g(x) = 0 (d) None of these

24) If α and β are the roots of $x^2 + px + q = 0$ and $\propto^4$ and β^4 are the roots of $x^2 - rx + s = 0$, then the equation $x^2 - 4qx + 2q^2 - r = 0$ has always
(a) Two real roots
(b) Two positive roots
(c) Two negative roots
(d) None of these

25) The equation $x - \frac{2}{x-1} = 1 - \frac{2}{x-1}$ has

(a) No root
(b) One root
(c) Two equal roots
(d) None of these

26) If $a + b + c = 0$, then the quadratic equation $3ax^2 + 2bx + c = 0$ has

(a) At least one root in [0,1]
(b) One root in [2,3] and the other in [-2, -1]
(c) Imaginary roots
(d) None of these

27) The number of real solutions of the equation $|x|^2 - 3|x| + 2 = 0$ is

(a) 1 (b) 2 (c) 3 (d) None of these.

28) If $a > 0$, $b > 0$ and $c > 0$, then both the roots of the equation $ax^2 + bx + c = 0$

(a) are real and negative
(b) Having positive real parts
(c) Have negative real parts
(d) None of these

29) Both the roots of the equation $(x - b)(x - c) + (x - a)(x - c) + (x - a)(x - b) = 0$ are always

(a) Positive (b) Negative (c) Real (d) None of these

30) If l, m,n are real, $l \neq m$, then the roots of the equation
$(l - m)x^2 - 5(l + m)x - 2(l - m) = 0$ are

(a) Real and equal
(b) Real and unequal
(c) Complex
(d) None of these

31) The entire graph of the equation $y = x^2 + kx - x + 9$ is strictly above the X-axis if

(a) $K < 7$ (b) $-5 < k < 7$ (c) $k > -5$ (d) None of these

32) If α and β are roots of the equation $ax^2 + bx + c = 0$,then
$(1 + \alpha + \alpha^2)(1 + \beta + \beta^2)$

(a) 0 (b) Positive (c) Negative (d) None of these

33) If the two equations $ax^2 + bx + c = 0$ and $px^2 + qx + r = 0$ have a common root, then the value of
$(aq – bp)(br – cq)$ is
(a) $–(ar – cp)^2$ (b) $(ap – cr)^2$ (c) $(ac – pr)^2$ (d) None of these

34) The set of values of p 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) None of these

35) If the roots of the equation $a(b – c)x^2 + b(c – a)x + c(a – b) = 0$ are equal, then a, b, c are in
(a) H.P. (b) G.P. (c) A.P. (d) None of these

36) The value of p for which the difference between the roots of the equation $x^2 + px + 8 = 0$ is 2 are
(a) ± 2 (b) ± 4 (c) ± 6 (d) None of these

37) If $a > 0$, then $\sqrt{a + \sqrt{a + \sqrt{a + \ldots\ldots\infty}}}$ =
(a) $\frac{1}{2}\sqrt{4a - 1}$
(b) $\frac{1}{2}\left[1 + \sqrt{4a - 1}\right]$
(c) $\frac{1}{2}\left[1 \pm \sqrt{4a - 1}\right]$
(d) None of these

38) If for the quadratic equation $ax^2 + bx + c = 0$, the difference of the roots is the same as their product, then the ratio of the roots is
(a) $\frac{a-b}{a+b}$ (b) $\frac{b-c}{b+c}$ (c) $\frac{c-a}{c+a}$ (d) None of these

39) The integral values of m for which the roots of the equation $mx^2 + (2m – 1)x + (m – 2) = 0$ for rational k are given by
(a) $k(k + 1)$ (b) $\frac{k^2-1}{4}$ (c) $\frac{k(k+2)}{4}$ (d) None of these

40) If $x^2 + 6x - 27 > 0$ and $-x^2 + 3x + 4 > 0$, the x lies in the interval

(a) (3,4) (b) [3,4] (c) (-9, 3) U [4, 9) (d) None of these

41) If 2, 3 are roots of the equation $2x^3 + mx^2 - 13x + n = 0$, then the values of m and n are

(a) -5, -30 (b) -5, 30 (c) 5, 30 (d) None of these

42) If the equations $ax^2 + 2cx + b = 0$ and $ax^2 + 2bx + c = 0$ ($b \neq c$) have a common root, then a + 4b + 4c =

(a) 0 (b) 1 (c) -1 (d) None of these

43) (a, b), (b, c) &(c, a) are roots of $x^2 - 2px + 3 = 0$, $x^2 - 2qx + 5 = 0$ &$x^2 - 2rx + 15 = 0$ Respectively , where a, b and c are positive real numbers. Find the value of p + q + r.

44) If a, b, c are positive real numbers such that $a^2 + b^2 + c^2 = 48$, then the maximum value of a + b + c is

45) find range of a for which one negative and two positive roots of $x^3-3x+a=0$ are possible

46) Let $f(x) = x^4 + ax^3 + bx^2 + cx + d$ be a polynomial whose roots are all negative integers. If a + b + c + d = 2009, find d

47) It is given that all roots of $x^3 + ax^2 + bx + c = 0$ are positive integers greater than 2 and it is also given that a + b + c = -2010. Find the value of a

48) The zeroes of the function $f(x)= x^2-ax+2a$ are integers .What is the sum of the possible values of a?

49) P, Q , R are roots of the equation $x^3 - 7x^2 - 6x + 5 = 0$. Find the value of

(P+Q)(Q+ R)(R + P)

50) How many distinct real roots the following equation has:-

$x^4 + 8x^2 + 16 = 4x^2 - 12x + 9$

Answer Keys

1	b
2	a
3	c
4	b
5	c
6	a
7	d
8	a
9	c
10	d
11	c
12	d
13	b
14	c
15	c
16	b
17	c
18	b
19	b
20	a
21	a
22	d
23	b
24	a
25	a
26	a
27	d
28	c
29	c
30	b
31	b

32	b
33	c
34	c
35	d
36	c
37	b
38	b
39	b
40	a
41	b
42	a
43	9
44	12
45	0 < a < 2
46	528
47	-58
48	16
49	-37
50	1