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|---------------------------------------|--------------------------|----------------------------|
| Date Planned : __ / __ / __           | Daily Tutorial Sheet - 5 | Expected Duration : 90 Min |
| Actual Date of Attempt : __ / __ / __ | Level – 1                | Exact Duration : _____     |

61. 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)  $(0, \infty)$

62. If the equation  $x^2 + 2(k+1)x + 9k - 5 = 0$  has only negative roots, then:



- (A)  $k \in (-\infty, 0]$  (B)  $k \in [0, \infty)$   
(C)  $k \in \left(\frac{5}{9}, 1\right] \cup [6, \infty)$  (D)  $k \in (-\infty, 6]$

63. If  $x^2 + ax + b$  is an integer for every integer  $x$ , then :



- (A)  $a$  is always an integer but  $b$  need not be an integer  
(B)  $b$  is always an integer but  $a$  need not be an integer  
(C)  $a$  and  $b$  are non-integers but  $a + b$  is always an integer  
(D)  $a$  and  $b$  are always integers

64. If  $\frac{6x^2 - 5x - 3}{x^2 - 2x + 6} \leq 4$ , then least and the highest values of  $4x^2$  are :



- (A) 0 and 81 (B) 9 and 81 (C) 36 and 81 (D) None of these

65. Solution set of  $\frac{1}{x^2 - x + 1} \geq 4$  is :

- (A)  $x \in \mathbb{R}$  (B)  $x \in (0, \infty)$  (C)  $\phi$  (D) None of these

66. If  $\alpha, \beta$  are the roots of the equation  $x^2 - px + q = 0$ , then  $\frac{\alpha^2}{\beta^2} + \frac{\beta^2}{\alpha^2}$  is equal to :

- (A)  $\frac{p^4}{q^2} + 2 - \frac{4p^2}{q}$  (B)  $\frac{p^4}{q^2} - 2 + \frac{4p^2}{q}$   
(C)  $\frac{p^4}{q^2} + 2q^2 - \frac{4p^2}{q}$  (D) None of these

67. The real values of  $x$  for which  $y = \sqrt{\frac{(x+1)(x-3)}{x-2}}$  takes real values are :

- (A)  $-1 \leq x < 2$  or  $x \geq 3$  (B)  $1 < x < 2$  or  $x > 2$   
(C)  $x < 2$  or  $x > 3$  (D)  $x > 2$

- 68.** If  $\alpha, \beta$  are the roots of  $ax^2 + bx + c = 0$ ;  $\alpha + h, \beta + h$  are the roots of  $px^2 + qx + r = 0$ , then  $h$  is equal to :
- (A)  $\left(\frac{b}{a} - \frac{q}{p}\right)$  (B)  $\frac{1}{2}\left(\frac{b}{a} - \frac{q}{p}\right)$  (C)  $-\frac{1}{2}\left(\frac{b}{a} - \frac{q}{p}\right)$  (D) None of these
- 69.** Let  $\alpha, \beta$  be the roots of  $x^2 + bx + 1 = 0$ . Then the equation whose roots are  $-\left(\alpha + \frac{1}{\beta}\right)$  and  $-\left(\beta + \frac{1}{\alpha}\right)$  is :
- (A)  $x^2 = 0$  (B)  $x^2 + 2bx + 4 = 0$  (C)  $x^2 - 2bx + 4 = 0$  (D)  $x^2 - bx + 1 = 0$
- 70.** The solution set contained in  $\mathbb{R}$  of the inequation  $3^x + 3^{1-x} - 4 < 0$ , is  $x \in$  :
- (A)  $(1, 3)$  (B)  $(0, 1)$  (C)  $(1, 2)$  (D)  $(0, 2)$
- 71.** The number of real roots of  $(7 + 4\sqrt{3})^{|x| - 8} + (7 - 4\sqrt{3})^{|x| - 8} = 14$  is :
- (A) 0 (B) 2 (C) 4 (D) None of these
- 72.** The sum of all real roots of the equation  $|x - 2|^2 + |x - 2| - 2 = 0$  is :
- (A) 2 (B) 4 (C) 1 (D) None of these
- 73.** Both the roots of the equation  $(x - a)(x - b) + (x - b)(x - c) + (x - c)(x - a) = 0$  are always :
- (A) Positive (B) Negative (C) Real (D) None of these
- 74.** If the equation  $\frac{a}{x - a} + \frac{b}{x - b} = 1$  has roots equal in magnitude but opposite in sign, then the value of  $a + b$  is :
- (A) -1 (B) 0 (C) 1 (D) None of these
- \*75.** The roots of  $\frac{1}{x - 1} + \frac{1}{x - 2} + \frac{1}{x - 3} = 0$  are :
- (A) Real (B) Real and equal  
(C) Real and not equal (D) Imaginary