



**1 Choose the correct answer from those given**

**1** The S.S of the two equations :  $x + y = 0$  ,  $y - 5 = 0$  is .....

- (a)  $\{5, -5\}$       (b)  $\{(5, -5)\}$       (c)  $\{(-5, 5)\}$       (d)  $(-5, 5)$

**2** The S.S of the two equations :  $x - 2y = 1$  ,  $3x + y = 10$  is .....

- (a)  $\{(5, 2)\}$       (b)  $\{(2, 4)\}$       (c)  $\{(1, 3)\}$       (d)  $\{(3, 1)\}$

**3** The two equations :  $3x + 5y = 0$  ,  $5x - 3y = 0$  are intersected in .....

- (a) First quadrant      (b) Second quadrant      (c) The origin point      (d) Fourth quadrant

**4** The S.S of the two equations :  $x = 3$  ,  $y = 4$  is .....

- (a)  $\{(3, 4)\}$       (b)  $\{(4, 3)\}$       (c)  $\mathbb{R}$       (d)  $\emptyset$

**5** The number of solutions of the two equations :  $x + y = 2$  ,  $y + x = 3$  together is .....

- (a) zero      (b) 1      (c) 2      (d) 3

**6** The two straight lines representing the two equations :  $2x - y = 4$  ,  $2x - 3 = y$  are .....

- (a) Parallel      (b) Coincident      (c) Perpendicular      (d) intersecting

**7** The two straight lines representing the two equations :  $6x - 9y = 15$  ,  $2x - 3y = 5$  are .....

- (a) Parallel      (b) Coincident      (c) Perpendicular      (d) intersecting

**8** If The two straight lines representing the two equations :  $x + 3y = 4$  ,  $x + a y = 7$  are parallel

Then :  $a =$  .....

- (a) 3      (b) 2      (c) -3      (d) -2

**9** If there is only one solution for the two equations :  $x + 2y = 1$  ,  $2x + k y = 2$ .

Then :  $k$  cannot equal .....

- (a) 2      (b) 3      (c) 4      (d) -4

**10** If the point of intersection of the two equations :  $x - 3 = 0$  ,  $y + 2k = 5$  lies on the fourth quadrant

Then :  $k$  may be equal .....

- (a) -1      (b) -2      (c) 1      (d) 3

**11** The number of solutions of the equation :  $x + y = 5$  in  $\mathbb{R} \times \mathbb{R}$  is .....

- (a) zero      (b) 1      (c) 2      (d) Infinite numbers





12 If the point  $(9, 2)$  belong to the set of solutions of the equation :  $x - ky = 3$  , then :  $k =$  .....

- (a) 1 (b) 2 (c) 3 (d) 6

13 Two numbers their sum = 13 and their difference is 5 , then the two number are .....

- (a) 7 and 6 (b) 8 and 5 (c) 9 and 4 (d) 10 and 3

14 Three years ago , ahmed's age was  $x$  years , then his age after 5 years is ..... years

- (a)  $x + 3$  (b)  $x + 5$  (c)  $x + 8$  (d)  $x + 2$

15 If the age of ahmed now is  $x$  years , then his age 4 years ago is ..... years.

- (a)  $x + 4$  (b)  $x - 4$  (c)  $x$  (d)  $4x$

16 A two-digit-number , ones digit is  $x$  and tens digit is  $y$  , then the number is .....

- (a)  $x + 10y$  (b)  $y + 10x$  (c)  $xy$  (d)  $x + y$

17 The solution set of the equation :  $x^2 + 4 = 0$  in  $\mathbb{R}$  is .....

- (a)  $\{2\}$  (b)  $\{2, -2\}$  (c)  $\{-2\}$  (d)  $\emptyset$

18 If the curve of the quadratic function  $f$  does not intersect X-axis at any points.

then the number of solution of the equation :  $f(x) = 0$  in  $\mathbb{R}$  is .....

- (a) A unique solution (b) An infinite solutions  
(c) zero (d) One solution

19 If the curve of the quadratic function  $f$  passes through the points  $(2, 0)$  ,  $(0, -3)$  ,  $(3, 0)$ .

then the solution set of the equation :  $f(x) = 0$  in  $\mathbb{R}$  is .....

- (a)  $\{2, -3\}$  (b)  $\{2, 3\}$  (c)  $\{2, 3, -3\}$  (d)  $\{-3\}$

20 If the curve of the quadratic function  $f$  has a minimum value at  $y = 1$ .

then the solution set of the equation :  $f(x) = 0$  in  $\mathbb{R}$  is .....

- (a)  $\{1\}$  (b)  $\{-1\}$  (c)  $\mathbb{R}$  (d)  $\emptyset$

21 The curve of the quadratic function  $f$  where  $f(x) = x^2 - 6x + 9$  .....

- (a) Intersect X-axis in two points. (b) Intersect X-axis in one point.  
(c) Does not intersect X-axis. (d) Passes through the origin point.

22 If :  $x = 3$  is one of the solutions of the function  $f : f(x) = x^2 - ax + 3$  , Then :  $a =$  .....

- (a) 1 (b) 2 (c) 3 (d) 4

23 The number of solutions of the equation :  $x^2 - 3x - 4 = 0$  in  $\mathbb{N}$  is .....

- (a) zero (b) 1 (c) 2 (d) 3





- 24 in the equation :  $x^2 + ax + 1 = 0$  , if :  $a \in ] - 2 , 2 [$  , then the number of solution of the equation in  $\mathbb{R}$  is .....
- (a) zero (b) 1 (c) 2 (d) 3
- 25 Two numbers , their sum = 9 and their multiplying is 20 , then the two number are .....
- (a) 10 and 2 (b) 4 and 5 (c) - 4 and - 5 (d) 8 and 1
- 26 If :  $x + y = 3$  and  $x^2 - y^2 = 6$  , then :  $x - y =$  .....
- (a) 18 (b) 9 (c) 3 (d) 2
- 27 If :  $x^2 + y^2 = 9$  and  $(x + y)^2 = 17$  , then :  $x - y =$  .....
- (a) 16 (b) 8 (c) 4 (d) 2
- 28 The S.S of the two equations :  $x - y = 0$  ,  $xy = 9$  in  $\mathbb{R} \times \mathbb{R}$  is .....
- (a)  $\{(0, 0)\}$  (b)  $\{(-3, -3)\}$  (c)  $\{(3, 3)\}$  (d)  $\{(3, 3), (-3, -3)\}$
- 29 one of the solutions of the two equations :  $x - y = 2$  ,  $x^2 + y^2 = 20$  in  $\mathbb{R} \times \mathbb{R}$  is .....
- (a)  $(-4, 2)$  (b)  $(2, -4)$  (c)  $(3, 1)$  (d)  $(4, 2)$
- 30 The set of zeroes of the function :  $f : f(x) = -3x$  is .....
- (a)  $\{0\}$  (b)  $\{-3, 0\}$  (c)  $\{-3\}$  (d)  $\mathbb{R}$
- 31 The set of zeroes of the function :  $f : f(x) = 0$  is .....
- (a)  $\{0\}$  (b)  $\mathbb{R} - \{0\}$  (c)  $\emptyset$  (d)  $\mathbb{R}$
- 32 The set of zeroes of the function :  $f : f(x) = x(x^2 - 2x + 1)$  is .....
- (a)  $\{1\}$  (b)  $\{0, 1\}$  (c)  $\{0, -1\}$  (d)  $\{0\}$
- 33 If :  $z(f) = \{2\}$  ,  $f(x) = x^3 - m$  , then :  $m =$  .....
- (a) 1 (b) 2 (c) 4 (d) 8
- 34 If :  $z(f) = \{5\}$  ,  $f(x) = x^3 - 3x^2 + a$  , then :  $a =$  .....
- (a) - 5 (b) 5 (c) - 50 (d) 50
- 35 If :  $z(f) = \mathbb{R}$  ,  $f(x) = (a - 3)x + b - 2$  , then :  $a + b =$  .....
- (a) 1 (b) - 1 (c) 5 (d) - 5
- 36 The Domain of the function  $f : f(x) = x^2 - 3x + 2$  is .....
- (a)  $\mathbb{R} - \{2, 1\}$  (b)  $\{2, 1\}$  (c)  $\mathbb{R}$  (d)  $\mathbb{R} - \{0\}$





37 The Domain of the function  $n : n(x) = \frac{x}{x^2 - 16}$  is .....

- (a)  $\mathbb{R} - \{4, -4\}$  (b)  $\mathbb{R} - \{4\}$  (c)  $\mathbb{R} - \{-4\}$  (d)  $\mathbb{R}$

38 The Domain of the algebraic function  $n : n(x) = \frac{x}{x^2 + 4}$  is .....

- (a)  $\mathbb{R} - \{2, -2\}$  (b)  $\{2\}$  (c)  $\mathbb{R}$  (d)  $\mathbb{R} - \{-2\}$

39 If the Domain of the algebraic function  $n$  is  $\mathbb{R} - \{2, 3, 4\}$ , then :  $n(3) =$  .....

- (a) 2 (b) 3 (c) 4 (d) Undefined

40 If the Domain of the algebraic function  $n : n(x) = \frac{x-4}{x^2+a}$  is  $\mathbb{R}$ , then :  $a$  ..... 0

- (a) = (b) < (c) > (d)  $\leq$

41 The set of zeroes of the function  $f : f(x) = \frac{x^2 - 9}{x - 3}$  is .....

- (a)  $\{3, -3\}$  (b)  $\{3\}$  (c)  $\{0\}$  (d)  $\{-3\}$

42 The common Domain of the two algebraic function :  $\frac{2}{x^2 - 1}$  and  $\frac{5x}{x^2 - x}$  is .....

- (a)  $\mathbb{R} - \{0, 1\}$  (b)  $\mathbb{R} - \{1\}$  (c)  $\mathbb{R} - \{0, 1, -1\}$  (d)  $\mathbb{R} - \{1, -1\}$

43 If :  $x = 3$  is one of zeroes of the function  $f : f(x) = \frac{x^2 - 2x - k}{x^2 - 25}$ , then :  $k =$  .....

- (a) 3 (b) 6 (c) -3 (d) -6

44 If the common Domain of the two algebraic function :  $\frac{-7}{x+2}$  and  $\frac{x-3}{x-a}$  is  $\mathbb{R} - \{-2, 7\}$ , then :  $a =$  .....

- (a) -2 (b) -7 (c) 3 (d) 7

45 The simplest form of the fraction  $n : n(x) = \frac{4x^2 - 2x}{2x}$ ,  $x \neq 0$  is .....

- (a)  $\frac{x-2}{2}$  (b)  $x-2$  (c)  $2x-1$  (d)  $\frac{2x-1}{2}$

46 The simplest form of the fraction  $n : n(x) = \frac{x}{x-1} + \frac{1}{1-x}$ ,  $x \neq 1$  is .....

- (a)  $\frac{x+1}{x-1}$  (b)  $\frac{x+1}{1-x}$  (c) 1 (d) -1

47 The additive inverse of the fraction  $n : n(x) = \frac{x-1}{x+3}$ ,  $x \neq -3$  is .....

- (a)  $\frac{x+1}{x-3}$  (b)  $\frac{1-x}{x+3}$  (c)  $\frac{x+1}{-(x+3)}$  (d)  $\frac{1-x}{-(x+3)}$

48 The fraction  $n : n(x) = \frac{x-4}{x-7}$  has an additive inverse to each  $x \in$  .....

- (a)  $\mathbb{R} - \{4, 7\}$  (b)  $\mathbb{R} - \{4\}$  (c)  $\mathbb{R} - \{7\}$  (d)  $\mathbb{R}$





49 If  $n : n(x) = \frac{x-2}{x+5}$ , then the domain of  $n^{-1}$  is .....

- (a)  $\mathbb{R}$  (b)  $\mathbb{R} - \{2\}$  (c)  $\mathbb{R} - \{-5\}$  (d)  $\mathbb{R} - \{2, -5\}$

50 If  $n(x) = \frac{x}{x^2+9}$ , then the domain of  $n^{-1}$  is .....

- (a)  $\emptyset$  (b)  $\mathbb{R} - \{-3, 3\}$  (c)  $\mathbb{R} - \{0\}$  (d)  $\mathbb{R}$

51 The multiplicative inverse of the fraction  $n : n(x) = \frac{x-3}{x^2-9} \times \frac{x+3}{x}$  is .....

- (a)  $\frac{1}{x}$  (b)  $\frac{-1}{x}$  (c)  $x$  (d)  $-x$

52 The fraction  $n : n(x) = \frac{x-4}{x-7}$  has an multiplicative inverse to each  $x \in$  .....

- (a)  $\mathbb{R} - \{4, 7\}$  (b)  $\mathbb{R} - \{4\}$  (c)  $\mathbb{R} - \{7\}$  (d)  $\mathbb{R}$

53 If  $n(x) = \frac{x-3}{x^2-4}$ , then the domain of  $n^{-1}(3) =$  .....

- (a) 0 (b) 1 (c) 2 (d) Undefined

54 If  $n(x) = \frac{x-2}{x^2-5x+6}$  and  $n^{-1}(x) = 5$ , then  $x =$  .....

- (a) 2 (b) 8 (c) 3 (d) 1

2 Find algebraically in  $\mathbb{R} \times \mathbb{R}$  the solution set of each pair of the following equations

- |   |   |   |                                  |                        |
|---|---|---|----------------------------------|------------------------|
| 1 | $2x - y = 3$                              | , | $x + 2y = 4$                     | $\{(2, 1)\}$           |
| 2 | $3x + 4y = 24$                            | , | $x - 2y = -2$                    | $\{(4, 3)\}$           |
| 3 | $3x + 2y = 11$                            | , | $2x + 3y = 14$                   | $\{(1, 4)\}$           |
| 4 | $\frac{x}{6} + \frac{y}{3} = \frac{1}{3}$ | , | $\frac{x}{2} + \frac{2y}{3} = 1$ | $\{(2, 0)\}$           |
| 5 | $x - y = 1$                               | , | $x^2 + y^2 = 25$                 | $\{(-3, -4), (4, 3)\}$ |
| 6 | $x + y = 7$                               | , | $y^2 - x^2 = 7$                  | $\{(3, 4)\}$           |
| 7 | $y - x = 3$                               | , | $x^2 + y^2 - xy = 13$            | $\{(-4, -1), (1, 4)\}$ |
| 8 | $x + y = 2$                               | , | $\frac{1}{x} + \frac{1}{y} = 2$  | $\{(1, 1)\}$           |

3 Find in  $\mathbb{R}$  the solution set of each of the following equations using the general formula

- |   |  |                     |
|---|--|---------------------|
| 1 | $2x^2 - 4x + 1 = 0$ (rounding the result to three decimal numbers)               | $\{0.293, 1.707\}$  |
| 2 | $x(x-1) = 4$ (rounding the result to three decimal numbers)                      | $\{-1.562, 2.562\}$ |
| 3 | $x - \frac{4}{x} = 4$ (rounding the result to three decimal numbers)             | $\{-0.828, 4.828\}$ |
| 4 | $\frac{8}{x^2} - \frac{1}{x} = 1$ (rounding the result to three decimal numbers) | $\{-3.372, 2.372\}$ |
| 5 | $(x-3)^2 - 5x = 0$ (rounding the result to three decimal numbers)                | $\{0.890, 10.110\}$ |





**4** in each of the following Find  $n(x)$  in the simplest form showing the domain of each of them

1  $n(x) = \frac{x^2 - 25}{x^2 - 3x - 10}$

3  $n(x) = \frac{x}{x-4} + \frac{x+4}{x^2-16}$

5  $n(x) = \frac{x^2 + 2x + 4}{x^3 - 8} - \frac{9 - x^2}{x^2 + x - 6}$

7  $n(x) = \frac{x^2 - 5x}{x^2 - 8x + 15} - \frac{x^2 + 3x + 9}{x^3 - 27}$ , then find  $n(1)$  and  $n(5)$

8  $n(x) = \frac{x^3 - 1}{x^2 - 2x + 1} \times \frac{2x - 2}{x^2 + x + 1}$

10  $n(x) = \frac{x^2 + 2x - 3}{x + 3} \div \frac{x^2 - 1}{x + 1}$

12  $n(x) = \frac{x^2 - 49}{x^3 - 8} \div \frac{x + 7}{x - 2}$ , then find  $n(1)$

2  $n(x) = \frac{x^3 - 4x}{x^3 - 5x^2 + 6x}$

4  $n(x) = \frac{x - 6}{2x^2 - 15x + 18} + \frac{x - 5}{15 - 13x + 2x^2}$

6  $n(x) = \frac{x^2 - 3x + 2}{1 - x^2} \div \frac{3x - 15}{x^2 - 6x + 5}$

9  $n(x) = \frac{x^3 - 1}{x^2 - x} \times \frac{x + 3}{x^2 + x + 1}$

11  $n(x) = \frac{x^2 - 2x - 15}{x^2 - 9} \div \frac{2x - 10}{x^2 - 6x + 9}$

**5** Answer the following question

1 If the Domain of the algebraic function  $n : n(x) = \frac{x - 1}{x^2 + ax + 9}$  is  $\mathbb{R} - \{3\}$ , then.

**Find the value  $a$ .**

2 If the Domain of the algebraic function  $n : n(x) = \frac{x + 2}{x^2 + ax + b}$  is  $\mathbb{R} - \{2, 3\}$ .

**Find the value  $a$  and  $b$ .**

3 If:  $n_1(x) = \frac{x^2 - x}{x^3 - 2x^2}$  and  $n_2(x) = \frac{x^2 - 3x + 2}{x^3 - 4x^2 + 4x}$ . **Prove that :  $n_1 = n_2$ .**

4 If the set of zeros of the function  $f : f(x) = ax^2 + bx + 15$  is  $\{3, 5\}$

**Find the value  $a$  and  $b$ .**

5 A length of a rectangle is 3 cm. more than its width and its area is  $28 \text{ cm}^2$ . **Find its perimeter.**

6 A right angled triangle in which the length of the hypotenuse = 13 cm. and its perimeter = 30 cm. **Find the area of the triangle.**

7 **Graph the function  $f : f(x) = x^2 - 6x + 5$  in the interval  $[0, 6]$ , and from the graph and its **Find the solution set of the equation :  $x^2 - 6x + 5 = 0$ .****

8 A two-digit number, the sum of its digits is 11, if the two digits reversed, then the resulted number is 27 more than the original number, **what is the original number.**

9 Two acute angles in a right-angled triangle, the difference between their measures =  $50^\circ$  **Find the measure of each angle.**

10 **Find the value  $a$  and  $b$ , if  $(3, -1)$  is the solution set of the two equations :**

$ax + by = 5$  and  $3ax + by = 17$

