MATHEMATICS

<div style="border:1px solid">PAIR OF LINEAR EQUATIONS IN TWO VARIABLES</div>

1. If $x + \dfrac{y}{2} = 5$ & $\dfrac{x}{2} + y = \dfrac{11}{2}$, then

    (A) x = 1, y = 2　　　　　　　　　　(B) x = 3, y = 4

    (C) x = 2, y = 2　　　　　　　　　　(D) x = 3, y = 3

SOL :　As 2x + y = 10 and x + 2y = 1

　　　Equation

　　　Now solve by substitution

ANS :　B

2. If $\dfrac{2x+1}{3} + \dfrac{3y-1}{2} = 2$ & $\dfrac{3x-1}{2} + \dfrac{2y+1}{3} = 2$, then

    (A) x = 1, y = 2　　　　　　　　　　(B) x = 1, y = 1

    (C) x = 1, y = 1/2　　　　　　　　　(D) x = 1/2, y = 1/2

SOL :　Take method $\dfrac{2x}{3} + \dfrac{1}{3} + \dfrac{3y}{2} - \dfrac{1}{2} = \dfrac{2}{1}$　　$\dfrac{3x-1}{2} + \dfrac{2y+1}{3} = 2$

　　　Solving $\dfrac{4x+2+6y-3}{6} = \dfrac{2}{7}$　　$\dfrac{9x-3+4y+2}{6} = 2$

　　　Equation 4x + 6y = 13 of 9x + 4y = 13

　　　Now apply substitution equation and find the value of x and y.

ANS :　B

3. If $\dfrac{2}{x} + \dfrac{3}{y} = \dfrac{9}{xy}$ & $\dfrac{4}{x} - \dfrac{9}{y} = \dfrac{3}{xy}$, then

    (A) x = 3, y = 1　　　　　　　　　　(B) x = 1, y = 3

    (C) x = 1, y = 1　　　　　　　　　　(D) x = 2, y = 2

SOL :　Multiplying the equation by xy we get

2x + 3x = 9 4y − 0x = 3

then solve the equations by substitution method

ANS : A

4.   If 3ax + 2by = 5ab & 5ax − 3by = 2ab, then

(A) x = b, y = a   (B) x = a, y = b

(C) x = y = a   (D) x = y = b

SOL : 3ax + 2by = 5ab   .....   (i)

5ax − 3by = 2ab   ....   (ii)

Multiplying (i) by 3 and (ii) by 2,

9ax + 6by = 15ab   ....   (iii)

10ax − 6by = 4ab   ....   (iv)

Adding (iii) and (iv),

19ax = 19ab   ⟹ x = b

Substituting this value of x in (i),

3a(b) + 2by = 5ab   ⟹ 2by = 5ab − 3ab = 2ab   ⟹ y = a.

Therefore, the solution is x = b, y = a.

ANS : A

5.   If $\dfrac{a}{x} - \dfrac{b}{y} = 0$ & $\dfrac{ab^2}{x} + \dfrac{a^2b}{y} = a^2 + b^2$, then

(A) x = y = b   (B) x = y = a

(C) x = a, y = b   (D) x = b, y = a

SOL : $\dfrac{a}{x} - \dfrac{b}{y} = 0$ ...(i)

$\dfrac{ab^2}{x} + \dfrac{a^2b}{y} = a^2 + b^2$ ...(ii)

From (i),

$\dfrac{a}{x} = \dfrac{b}{y} \Rightarrow bx = ay \Rightarrow x = \dfrac{ay}{b}$ ...(iii)

Substituting this value of x in (ii),

$\dfrac{ab^2}{ay/b} + \dfrac{a^2b}{y} = a^2 + b^2 \Rightarrow \dfrac{b^3}{y} + \dfrac{a^2b}{y} = a^2 + b^2$

$\Rightarrow \qquad \dfrac{b}{y}(b^2 + a^2) = a^2 + b^2 \Rightarrow (a^2 + b^2)y = b(a^2 + b^2)$

$\Rightarrow \qquad y = b$

Substituting this value of y in (iii),

$x = \dfrac{a}{b}(b) = a$

Therefore, the solution is x = a, y = b.

ANS : C

6. If $\dfrac{x}{a} = \dfrac{y}{b}$ & $ax + by = a^2 + b^2$, then

(A) x = a, y = b   (B) x = b, y = a

(C) x = a/2, y = b/s   (D) x = b/2, y = a/2

SOL : $\dfrac{x}{a} = \dfrac{y}{b}$ .....(i)

$ax + by = a^2 + b^2$ .....(ii)

From (i), $bx = ay \Rightarrow x = \dfrac{ay}{b}$

$a\left(\dfrac{ay}{b}\right) + by = a^2 + b^2 \Rightarrow \dfrac{a^2y}{b} + by = a^2 + b^2$ .....(iii)

Substituting this value of x in (ii),

$a\left(\dfrac{ay}{b}\right) + by = a^2 + b^2 \Rightarrow \dfrac{a^2y}{b} + by = a^2 + b^2$

$\Rightarrow \qquad \dfrac{a^2y + b^2y}{b} = a^2 + b^2 \Rightarrow (a^2 + b^2)y = b(a^2 + b^2) \Rightarrow y = b$

Substituting this value of y in (iii),

$$x = \frac{a}{b}(b) = a$$

Therefore, the solution is x = a, y = b

ANS : A

7.   The value of k for which the equations kx – 4y = 1 and 3x + 2y = 4 have a unique solution is

   (A) 0   (B) 1

   (C) 2   (D) any non zero value

ANS : D

8.   A earns 20% more than B but spends 20% less than B. If A saves Rs 960 and B saves Rs 200, then their incomes are

   (A) Rs. 2400, Rs. 2000   (B) Rs. 1200, Rs. 1100

   (C) Rs. 1800, Rs. 1600   (D) Rs. 1400, Rs. 1300

ANS : A

9.   If we added 5 to the denominator and subtract 5 from the numerator of a fraction, it reduces to $\frac{1}{7}$. If we subtract 3 from the numerator and add 3 to its denominator, it reduces to $\frac{1}{3}$. The fraction is

   (A) $\frac{3}{4}$ (B) $\frac{4}{5}$

   (C) $\frac{6}{7}$ (D) $\frac{7}{9}$

SOL : Let the numerator = x and the denominator = y.

   Then the given fraction $= \frac{x}{y}$.

   Given that the fraction becomes $\frac{1}{7}$ if 5 is added to the denominator and 5 is subtracted from the numerator.

   $\therefore \quad \frac{x-5}{y+5} = \frac{1}{7} \Rightarrow 7x - 35 = y + 5 \Rightarrow 7x - y = 40$ .....   (i)

Given also that the fraction becomes $\dfrac{1}{3}$ if 3 is subtracted from the numerator and 3 is added to its denominator.

$\therefore \qquad \dfrac{x-3}{y+3} = \dfrac{1}{3} \Rightarrow 3x-9 = y+3 \Rightarrow 3x-y = 12$ ..... (ii)

Subtracting (ii) from (i),

$4x = 28 \Rightarrow x = 7$

Substituting the value of x in (i),

$7(7) - y = 40 \Rightarrow y = 40 - 49 = -9 \Rightarrow y = 9$.

Therefore, the fraction is $\dfrac{7}{9}$.

ANS : D

10. The present age of a man is equal to the sum of the ages of his five children. Twelve years hence the sum of the ages of the children will be twice the age of their father. the present age of the father

(A) 36 years (B) 37 years

(C) 38 years (D) 39 years

SOL : Let the age of the father = x years and the sum of the ages of his 5 children = y years.

Given that the present age of the man is equal to the sum of the ages of his 5 children.

Therefore, x = y ..... (i)

After 12 years, since the age of each child will increase by 12 years, the sum of the ages of the 5 children will increase by (12 × 5) years.

Therefore, after 12 years, sum of the ages of 5 children = (y + 60) years

Given also that 12 years later, the sum of the ages of the children will be twice the age of their father.

$\therefore \qquad y + 60 = 2(x+12) \quad \text{or} \quad 2x - y = 36$ ..... (ii)

Substituting the value of x from (i) in (ii),

$2y - y = 36 \implies y = 36 \implies x = 36$

Therefore, the age of the father = 36 years.

ANS : A

11.   If 4 kg of sweets and 3 kg of apples together cost Rs 233 and 3 kg of sweets and 4 kg of apples together cost Rs 194, the cost per kilogram of each are

(A) Rs. 50, Rs. 11

(B) Rs. 40, Rs. 12

(C) Rs. 30, Rs. 18

(D) Rs. 28, Rs. 16

SOL : Let the cost of 1 kg of sweets = Rs x and the cost of 1 kg of apples = Rs y.

Cost of 4 kg of sweets and 3 kg of apples = Rs 233

$\implies 4x + 3y = 233$ ..... (i)

Cost of 3 kg of sweets and 4 kg of apples = Rs 194

$\implies 3x + 4y = 194$ ..... (ii)

Adding (i) and (ii),

$7x + 7y = 427 \implies x + y = 61$ ..... (iii)

Substracting (ii) from (i),

$x - y = 39$ ..... (iv)

Adding (iii) and (iv),

$2x = 100 \implies x = 50$.

Substituting this value of x in (iii),

$50 + y = 61 \implies y = 61 - 50 = 11$

So, cost of 1 kg of sweets = Rs 50 and cost of 1 kg of apples = Rs 11.

ANS : A

12.   The difference between the ages of A and B is 2 years. A's father, F, is twice as old as A, and B is twice as old as his sister S. If the difference between the ages of F and S is 40 years, the ages of A and B are

(A) 25 years, 23 years   (B) 26 years, 24 years

(C) 20 years, 24 years   (D) 17 years, 15 years

ANS : B

13.   Ten years ago a man was 12 times as old as his son. Ten years hence he will be twice as old as his son. their present ages are

(A) 34 years, 12 years   (B) 26 years, 24 years

(C) 20 years, 18 years   (D) 17 years, 15 years

SOL : Let the age of the son = x years and the age of the father = y years.

Given that 10 years ago the man was 12 times as old as his son.

$\therefore$ $y - 10 = 12(x - 10)$ or $12x - y = 110$ .....   (i)

Given also that 10 years hence he will be twice as old as his son.

$\therefore$ $y + 10 = 2(x + 10)$ or $2x - y = 10$ .....   (ii)

Subtracting (ii) from (i),

10x = 120 $\Rightarrow$ x = 12.

Substituting this value of x in (i),

$12(12) - y = 110 \Rightarrow -y = 110 - 144 = -34 \Rightarrow y = 34$.

So, the age of the man = 34 years and the age of his son = 12 years.

ANS : A

14.   A two-digit number is obtained by either multiplying the sum of the digits by 7 and adding 3 to the product, or by multiplying the difference of the digits by 18 and adding 1 to the result. the number is

(A) 73   (B) 71

(C) 69   (D) 67

SOL : Let the units digit = x and the tens digit = y

Then the number = 10y + x

Given that the number is obtained by multiplying the sum of the digits by 7 and then adding 3 to the result.

$\therefore \quad 10y + x = 7(x + y) + 3 \Rightarrow 6x - 3y = -3$

$\Rightarrow \quad 2x - y = -1$ ..... (i)

Given also that the number can be obtained by multiplying the difference of the digits by 18 and adding 1 to the result.

$\therefore \quad 10y + x = 18(y - x) + 1 \quad \text{or} \quad 19x - 8y = 1$ ..... (ii)

Multiplying (i) by 8,

16x – 8y = – 8 ..... (iii)

Subtracting (iii) from (ii),

3x = 9 $\Rightarrow$ x = 3

Substituting this value of x in (i),

$2(3) - y = -1 \Rightarrow -y = -1 - 6 = -7 \Rightarrow y = 7$

Therefore the number = 10y + x = 10(7) + 3 = 73.

ANS : A

15. A man takes 3 hours to cover a certain distance upstream and takes only half the time to return. If the speed of the river is 5 km/h, the speed at which the man can row in still water is

(A) 50 km/hr (B) 40 km/hr

(C) 30 km/hr (D) 20 km/hr

SOL : Let the distance covered upstream = x km.

Let the speed of boat in still water = y km/h.

Given that the speed of the river = 5 km/h.

Then speed upstream = (y – 5) km/h and

speed downstream = (y + 5) km/h.

Given that the man takes 3 hours going upstream.

$\therefore \quad \dfrac{x}{y-5} = 3 \Rightarrow x = 3y - 15 \Rightarrow x - 3y = -15$ ..... (i)

Given also that he takes 3/2 hours to return.

$$\therefore \quad \frac{x}{y+5} = \frac{3}{2} \Rightarrow 2x = 3y + 15$$

$$\Rightarrow 2x - 3y = 15 \qquad\qquad\qquad ..... \quad \text{(ii)}$$

Subtracting (ii) from (i),

$$-x = -30 \Rightarrow x = 30.$$

Substituting this value of x in (ii),

$$2(30) - 3y = 15 \Rightarrow -3y = 15 - 60 = -45 \Rightarrow y = 15$$

Therefore distance covered each way = 30 km and speed of the boat = 15 km/h.

ANS : A

16. The equations 3x - 5y + 2 = 0, and 6x + 4 = 10 y have :

(A) No solution   (B) A single solution

(C) Two solutions   (D) An infinite number of solution

ANS : D

17. If p + q = 1 and the ordered pair (p, q) satisfy 3x + 2y = 1 then is also satisfies :

(A) 3x + 4y = 5   (B) 5x + 4y = 4   (C) 5x + 5y = 4   (D) None of these.

ANS : A

18. If x = y, 3x - y = 4 and x + y + x = 6 then the value of z is :

(A) 1   (B) 2   (C) 3   (D) 4

ANS : B

19. The system of linear equation ax + by = 0, cx + dy = 0 has no solution if :

(A) ad - bc > 0   (B) ad - bc < 0   (C) ad + bc = 0   (D) ad - bc = 0

ANS : D

20. The value of k for which the system kx + 3y = 7 and 2x - 5y = 3 has no solution is :

(A) $7 \& k = -\frac{3}{14}$ (B) $4 \& k = \frac{3}{14}$ (C) $\frac{6}{5} \& k \neq \frac{14}{3}$ (D) $-\frac{6}{5} \& k \neq \frac{14}{3}$

ANS : D

21.   If 29x + 37y = 103, 37x + 29y = 95 then :

(A) x = 1, y = 2   (B) x = 2, y = 1   (C) x = 2, y = 3   (D) x = 3, y = 2

ANS : A

22.   On solving $\dfrac{25}{x+y} - \dfrac{3}{x-y} = 1, \dfrac{40}{x+y} + \dfrac{2}{x-y} = 5$ we get :

(A) x = 8, y = 6   (B) x = 4, y = 6   (C) x = 6, y = 4   (D) None of these

ANS : C

23.   If the system 2x + 3y - 5 = 0, 4x + ky - 10 = 0 has an infinite number of solutions then :

(A) $k = \dfrac{3}{2}$ (B) $k \neq \dfrac{3}{2}$ (C) $k \neq 6$ (D) k = 6

ANS : D

24.   The equation x + 2y = 4 and 2x + y = 5

(A) Are consistent and have a unique solution   (B) Are consistent and have infinitely solution

(C) are inconsistent   (B) Are homogeneous linear equations

ANS : A

25.   If $\dfrac{1}{x} - \dfrac{1}{y} = \dfrac{1}{z}$ then z will be :

(A) y - x   (B) x - y   (C) $\dfrac{y-x}{xy}$ (D) $\dfrac{xy}{y-x}$

ANS : D

26.   The graphs of 2x + 3y - 6 = 0, 4x - 3y - 6 = 0, x = 2 and y = $\dfrac{2}{3}$ intersects in :

(A) Four points   (B) one point   (C) two point   (D) infinite number of points

ANS : B

27.   The sum of two numbers is 20, their product is 40. The sum of their reciprocal is :

(A) $\dfrac{1}{2}$ (B) 2   (C) 4   (D) $\dfrac{1}{10}$

ANS : A

28. If Rs. 50 is distributed among 150 children giving 50 p to each boy and 25 p to each girl. Then the number of boys is :

(A) 25   (B) 40   (C) 36   (D) 50

ANS : D

29. In covering a distance of 30 km. Amit takes 2 hrs. more than suresh. If Amit doubles his speed, he would take one hour less than suresh. Amits' speed is :

(A) 5 km/hr.   (B) 7.5 km/hr.   (C) 6 km/hr.   (D) 6.2 km/hr.

ANS : A

30. If in a fraction 1 less from two times of numerator & 1 add in denominator then new fraction will be :

(A) $2\left(\dfrac{x-1}{y+1}\right)$ (B) $\dfrac{2(x+1)}{y+1}$ (C) $\left(\dfrac{x}{y}\right)$ (D) $\dfrac{2x-1}{y+1}$

ANS : D

31. If A : Homogeneous system of linear equations is always consistent. R : x = 0, y = 0 ix always a solution of the homogeneous system of equations with unknowns x and y, then which of the following statement is true ?

(A) A is true and R is the correct explanation of A

(B) A is false and R is not a correct explanation of A

(C) A is true and R is false

(D) A is false and R true

ANS : A

32. If the pair of linear equations x – y = 1, x + ky = 5 has a unique solution x = 2, y = 1, then value of k is –

(A) -2   (B) 3   (C)-3   (D) 4

ANS : B

33. The pair of linear equations $2x + ky - 3 = 0$, $6x + \dfrac{2}{3}y + 7 = 0$ has a unique solution if –

(A) $k = \dfrac{2}{3}$

(B) $k \neq \dfrac{2}{3}$

(C) $k = \dfrac{2}{9}$

(D) $k \neq \dfrac{2}{9}$

ANS : D

34. The pair of linear equations $2kx + 5y = 7$, $6x - 5y = 11$ has a unique solution if –

(A) $k \neq -3$

(B) $k \neq 3$

(C) $k \neq 5$

(D) $k \neq -5$

ANS : A

35. The pair of equations $3x + 4y = k$, $9x + 12y = 6$ has infinitely many solutions if –

(A) k = 2

(B) k = 6

(C) k $\neq$ 6

(D) k = 3

ANS : A

36. The pair of linear equations $2x + 5y = k$, $kx + 15y = 18$ has infinitely many solution if –

(A) k = 3   (B) k = 6   (C) k = 9   (D) k = 18

ANS : B

37. The pair of linear equations $3x + 5y = 3$, $6x + ky = 8$ do not have any solution if –

(A) k = 5   (B) k = 10   (C) k $\neq$ 10   (D) k $\neq$ 5

ANS : B

38. The pair of linear equations $3x + 7y = k$, $12x + 2ky = 4k + 1$ do not have any solution if

(A) k = 7   (B) k = 14   (C) k = 21   (D) k = 28

ANS : B

39. The pair of linear equations $7x - 3y = 4$, $3x + \dfrac{k}{7} y = 4$ is consistent only when –

    (A) k = 9   (B) k = - 9   (C) k ≠ - 9   (D) k ≠ 7

ANS : C

40. The pair of linear equations $kx + 4y = 5$, $3x + 2y = 5$ is consistent only when –

    (A) k ≠ 6   (B) k = 6   (C) k ≠ 3   (D) k = 3

ANS : A

41. The pair of linear equations $7x + ky = k$, $14x + 2y = k + 1$ has infinitely many solution if –

    (A) k = 1   (B) k ≠ 1   (C) k = 2   (D) k = 4

ANS : A

42. The pair of linear equations $13x + ky = k$, $39x + 6y = k + 4$ has infinitely many solutions if -

    (A) k = 1   (B) k = 2   (C) k = 4   (D) k = 6

ANS : B

43. The pair of linear equations $x + y = 3$, $2x + 5y = 12$ has a unique solution $x = x_1$, $y - y_1$ then value of x_1 is –

    (A) 1   (B) 2   (C) -1   (D) -2

ANS : A

44. The pair of linear equations $3x - 5y + 1 = 0$, $2x - y + 3 = 0$ has a unique solution $x = x_1$, $y = y_1$ then $y_1 =$

    (A) 1   (B) -1   (C) -2   (D) – 4

ANS : B

45. The pair of linear equations $x + 2y = 5$, $7x + 3y = 13$ has a unique solution –

    (A) x = 1, y = 2   (B) x = 2, y = 1

    (C) x = 3, y = 1   (D) x = 1, y = 3

ANS :   A

46.   The pair of linear equations x + 2y = 5, 3x + 12y = 10 has –

        (A) Unique solution

        (B) No solution

        (C) More than two solution

        (D) Infinitely many solutions

ANS :   A

47.   If the sum of the ages of a father and his son in years is 65 and twice the difference of their ages
        in years is 50, then the age of father is –

        (A) 45 years   (B) 40 years   (C) 50 years   (D) 55 years

ANS :   A

48.   A fraction becomes $\dfrac{4}{5}$ when 1 is added to each of the numerator and denominator. However, if

        we subtract 5 from each then it becomes $\dfrac{1}{2}$. The fraction is –

        (A) $\dfrac{5}{8}$ (B) $\dfrac{5}{6}$ (C) $\dfrac{7}{9}$ (D) $\dfrac{13}{16}$

ANS :   C

49.   Three chairs and two tables cost Rs. 1850 Five chairs and three tables cost Rs. 1850. Then the
        total cost of one chair and table is –

        (A) Rs. 800   (B) Rs. 850   (C) Rs. 900   (D) Rs.950

ANS :   B

50.   Six years hence a man's age will be three times the age of his son and three years ago he was
        nine times as old as his son. The present age of the man is –

        (A) 28 years   (B) 30 years   (C) 32 years   (D) 34 years

ANS : B

51.   The number of solutions of the equation 2x + y = 40, where both x and y are positive integers and x $\leq$ y is :

        (A) 7   (B) 13   (C) 14   (D) 18

ANS : B

52.   A confused bank teller transposed the rupees and paise when he cashed a cherub for Mansi, giving her rupees instead of paisa and paise instead of rupees. After buying a toffee for 50 paise, Mansi noticed that she was left with exactly three times as much as the amount on the cheque. Which of the following is a valid statement about the cheque amount ?

        (A) Over Rs. 4 but less than Rs. 5   (B) Over Rs. 13 but less than Rs. 14

        (C) Over Rs. 7 but less than Rs. 8   (D) Over Rs. 18 but less than Rs. 19

ANS : D

53.   John inherited $25000 and invested part of it in a money market account, part in municipal bounds, and part in a mutual fund. After one year, he received a total of $ 1620 in simple interest from the three investments. The money market paid 6% annually, the bonds paid 7% annually, and the mutual funds paid 8% annually. There was $ 6000 more invested in the bonds than the mutual funds. The amount John invested in each category are in the ratio :

        (A) 15 : 8 : 2   (B) 11 : 13 : 1   (C) 2 : 2 : 1   (D) None of these

ANS : A

54.   Which one of the following conditions must p,q and r satisfy so that the following system of linear simultaneous equations has at least one solution , such that p + q + r$\neq$ 0 ?

        x + 2y $-$ 3z = p ; 2x + 6y $-$ 11z = q ; x - 2y + 7z = r

        (A) 5p $-$ 2q $-$ r = 0   (B) 5p + 2q + r = 0   (C) 5p + 2q $-$ r = 0   (D) 5p $-$ 2q + r = 0

ANS : A

55.   If x and y are integers, then the equation 5x + 19y = 64 has :

        (A) No solution for x < 300 and y < 0   (B) No solution for x > 250 and y > - 100

        (C) A solution for 250 < x < 300   (D) A solution for $-$ 59 < y < - 56

ANS : C

56. The number of solutions of the equation 2x + y = 40, where both x and y are positive integers and x ≤ y is :

    (A) 7 (B) 13 (C) 14 (D) 18

ANS : B

57. Study the question and statements given below : Decide whether any information provided in the statement (s) is redundant and / or can be dispensed with, to answer it.

    If 7 is added to numerator and denominator each of fraction a/b. will the new fraction be less than the original one ? (Assume both a and b to be positive)

    Statement-I : a = 73, b = 103

    Statement-II : The average of a and b is less than b.

    Statement-III : a – 5 is greater than b – 5.

    (A) II and either I or III (B) Only I or III (C) Any two of them (D) Any one of them

ANS : C

58. A cyclist drove 1 km, with the wind in his back , in 3 min and drove the same way back, against the wind in 4 min. If we assume that the cyclist always puts constant force on the pedals, how much time would it take to drive 1 km without wind ?

    (A) $2\dfrac{1}{3}$ min. (B) $3\dfrac{3}{7}$ min. (C) $2\dfrac{3}{7}$ min. (D) $3\dfrac{7}{12}$ min.

ANS : B

59. A person buys 18 local tickets for Rs. 110. Each first class ticket costs Rs. 10 and each second class ticket costs Rs. 3. What will another lot of 18 tickets in which the number of first class and second class tickets are interchanged cost ?

    (A) Rs. 112 (B) Rs. 118 (C) Rs. 121 (D) Rs. 124

ANS : D

60. Rajesh walks to and fro to a shopping mall. He spends 30 min. shopping. If he walks at a speed of 10 km/h, he returns to home at 19:00h. It he walks at 15 km/h. he returns at 18:30 h. How fast must he walk in order to return home at 18:15 h ?

    (A) 17 km/h (B) 17.5 km/h (C) 18 km/h (D) 20 km/h

ANS : D

61. A single reservoir supplies the petrol to the whole city, while the reservoir is fed by a single pipeline filling the reservoir with the stream of uniform volume. When the reservoir is full and if 40000 liters of petrol is used daily, the supply fails in 90 days. If 32000 liters of petrol is used daily, the supply fails in 60 days. How much petrol can be used daily without the supply ever failing ?

   (A) 64000 litres   (B) 56000 litres   (C) 78000 litres   (D) 60000 litres

ANS : B

62. Two horses start trotting towards each other, one from A to B and another from B to A . They cross each other after one hour and the first horse reaches B, 5/6 hours before the second hoarse reaches A. If the distance between A and B is 50 km. What is the speed of the slower hours ?

   (A) 30 km/h   (B) 15 km/h   (C) 25 km/h   (D) 20 km/h

ANS : D

63. A man row downstream at 12 km/h and upstream at 8 km/h. What is the speed of man in still water ?

   (A) 12 km/h   (B) 10 km/h   (C) 8 km/h   (D) 9 km/h

ANS : B

64. A motor boat takes 12 hours to go downstream and it takes 24 hours to return the same distance. What is the time taken by boat in still water ?

   (A) 15 h   (B) 16 h   (C) 8 h   (D) 20 h

ANS : B

65. Equation $xy^2 + xy^2 = 2xy$, x, y ≠ 0 is

   (A) Linear   (B) Quadratic   (C) Cubic   (D) Not an equation

ANS : A

66. Sum of two integers is 88. If the greater is divided by the smaller, the quotient is 5 and the remainder is 10. the greater integer is :

   (A) 13   (B) 75   (C) 65   (D) 23

ANS : B

67. The length of the sides of a triangle are $3x+2y, 4x+\frac{4}{3}y$ and $3(x+1)+\frac{3}{2}(y-1)$. If the triangle is equilateral, then its side is

(A) 8   (B) 10   (C) 12   (D) 16

ANS : C

68. The largest angle of a triangle is twice the sum of the other two. The smaller angle is one fourth of the largest. The largest angle is :

(A) 90^0 (B) 60^0 (C) 120^0 (D) None of these

ANS : C

69. In town, $\frac{2}{3}$ of men are married to $\frac{3}{7}$ of the women. In the town total population is more than 1000. If all marriages happen within the town. The smallest possible number of total population is (assume there are only adults in the town) :

(A) 1012   (B) 1035   (C) 1058   (D) None of these

ANS : A

70. The solution of the equations : $\frac{x}{4}=\frac{y}{3}=\frac{z}{2}$, $7x+8y+5z=62$ is :

(A) (4, 3, 2)   (B) (2, 3, 4)   (C) (3, 4, 2)   (D) (4, 2, 3)

ANS : A

71. If $\frac{1}{3}(x+y)2z=21$, $3x-\frac{1}{2}(y+z)=65$, $x+\frac{1}{2}(x+y-z)=38$, then its solution is :

(A) (24, 9, 5)   (B) (2, 9, 5)   (C) (4, 9, 5)   (D) (5, 24, 9)

ANS : A

72. The solution of the equations : $\frac{xy}{y-x}=110$, $\frac{yz}{z-y}=132$, $\frac{zx}{z+x}=\frac{60}{11}$ is :

(A) (12, 11, 10)   (B) (10, 11, 12)   (C) (11, 10, 12)   (D) (12, 10, 11)

ANS : B

73. Four men earn as much in a day as 7 women. 1 women earns as much as 2 boys. If 6 men, 10 women and 14 boys work together for 8 days to earn Rs. 2200, then what will be the earning of 8 men and 6 women working together is for 10 days ?

(A) Rs. 2000   (B) Rs. 1800   (C) Rs. 2400   (D) None of these

ANS : A

74. The point of intersection of the straight lines 2x – y + 3 = 0, 3x – 7y + 10 = 0 lies in :

(A) I quadrant   (B) II quadrant   (C) III quadrant   (D) IV quadrant

ANS : B

75. A right-angled triangle is formed by the straight line : 4x + 3y = 12 with both the axis. Then length of perpendicular from the origin to the hypotenuse is :

(A) 3.5 units   (B) 2.4 units   (C) 4.2 units   (D) None of these

ANS : B

76. Solve : 3x – 7 > x + 1, x ∈ R :

(A) $(4, \infty)$

(B) $[4, \infty)$

(C) $(-\infty, \ 4]$

(D) $(-\infty, \ 4]$

ANS : A

77. Solve : $\dfrac{x}{5} < \dfrac{3x - 2}{4} - \dfrac{5x - 3}{5}, x \in R$:

(A) $(2/9, \ \infty)$

(B) $[2/9, \ \infty)$

(C) $(-\infty, \ 2.9)$

(D) $(-\infty, \ 2.9)$

ANS : C

78. Solve : $\dfrac{2(x - 1)}{5} \le \dfrac{3(2 + x)}{7}, x \in R$:

(A) $(44, \ \infty)$

(B) $[44, \ \infty)$

(C) $[-44, \ \infty)$

(D) $(-44, \ \infty)$

ANS : C

79. Solve : $\dfrac{5x}{2} + \dfrac{3x}{4} \ge \dfrac{39}{4}, x \in R$:

(A) $(-3, \infty)$

(B) $(3, \infty)$

(C) $(-\infty, \ 3)$

(D) $[3, \ \infty)$

ANS : D

80. Solve : $\dfrac{x-1}{3} + 4 < \dfrac{x-5}{5} - 2, x \in R$:

(A) $(50, \infty)$

(B) $(-\infty, \ -50)$

(C) $[50, \ \infty)$

(D) None of these

ANS : B

81. Solve : $\dfrac{2x+3}{4} - 3 < \dfrac{x-4}{3} - 2, x \in R$:

(A) $(13/2, \infty)$

(B) $(-\infty, \ -13/2)$

(C) $(-13/2, \ \infty)$

(D) $[13/2, \ \infty)$

ANS : B

82. Solve : $\dfrac{5-2x}{3} < \dfrac{x}{6} - 5, x \in R$:

(A) $(8, \ \infty)$

(B) $[8, \ \infty)$

(C) $(-\infty, \ -8)$

(D) $(-\infty, \ 8)$

ANS : A

83. Solve : $\dfrac{4+2x}{3} \ge \dfrac{x}{2} - 3, x \in R$:

(A) $(26, \infty)$

(B) $(-\infty, \ 26]$

(C) $[-26, \ \infty)$

(D) $(-\infty, \ -26)$

ANS : C

84. Solve : $\dfrac{2x+3}{5} - 2 < \dfrac{3(x-2)}{5}, x \in R$:

(A) $(-1, \infty)$

(B) $[1, \ \infty)$

(C) $(-\infty, \ -1)$

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

ANS : A

85.   Solve : $x - 2 \le \dfrac{5x + 8}{3}, x \in R$

   (A) $[-7, \infty)$ (B) $(7, \infty)$ (C) $(-\infty, \ 7)$ (D) $(-\infty, \ 7)$

ANS : A

86.   Solve : $\dfrac{6x - 5}{4x + 1} < 0, x \in R$:

   (A) $(-1/4, 5/6)$ (B) $[-1/4, 5/6]$ (C) $(-\infty, \ -1/4)$ (D) $(5/6, \infty)$

ANS: A

87.   Solve : $\dfrac{2x - 3}{3x - 7} > 0, x \in R$

   (A) $[3/2, \ 7/3]$ (B) $(3/2, \ 7/3)$

   (C) $(-\infty, \ 3/2) \cup (7/3, \ \infty)$ (D) None of these

ANS :   C

88.   Solve : $\dfrac{3}{x - 2} < 1, x \in R$:

   (A) $(2, \ 5)$ (B) $[-\infty, \ 2) \cup (5, \ \infty)$

   (C) $(-\infty, \ -2) \cup (5, \ \infty)$ (D) None of these

ANS :   B

89.   Solve : $\dfrac{1}{x - 1} \le 2, x \in R$:

   (A) $(-1, 3/2]$ (B) $(-\infty, \ -1) \cup (3/2, \ \infty)$

   (C) $(-1, \ 3/2)$ (D) $(-\infty, \ 1) \cup [3/2, \ \infty)$

ANS : D

90. Solve : $\dfrac{4x+3}{2x-5} < 6, x \in R$

(A) $(5/2, 33/8)$

(B) $(-\infty, -5) \cup (4, \infty)$

(C) $(-5/2, 33/8)$

(D) $(-\infty, 5/2) \cup (33/8, \infty)$

ANS : D

91. Solve : $\dfrac{5x-6}{x+6} < 1, x \in R$:

(A) $(-6, -3)$

(B) $(6, \infty)$

(C) $(-6, 3)$

(D) None of these

ANS : C

92. Solve : $\dfrac{5x+8}{4-x} < 2, x \in R$:

(A) $[0,, 4)$

(B) $[4, \infty)$

(C) $(-\infty, 4)$

(D) $(-\infty, 0) \cup (4, \infty)$

ANS : D

93. Solve : $\dfrac{x-1}{x+3} > 2, x \in R$:

(A) $(7, 3)$

(B) $[7, 3]$

(C) $(-7, -3)$

(D) $[-7, -3]$

ANS : C

94. Solve : $\dfrac{7x-5}{8x+3} > 4, x \in R$:

(A) $(17/25, 3/8)$

(B) $(17/25, 3/8]$

(C) $(-17/25, -3/8)$

(D) $[17/25, 3/8]$

ANS : C

95. $\dfrac{2x-3}{3x-7} > 0, x \in R$

(A) $(-5, 5)$

(B) $[-5, 5]$

(C) $(-\infty, -5) \cup (5, \infty)$

(D) None of these

ANS : C

96. A bus conductor gets a total of 220 coins of 25 paise, 50 paise and Re. 1 daily. One day he gets Rs 110 and next day he gets Rs 80 in that the number of coins of 25 paise and 50 paise coins are interchanged then find the total number of 50 paise coins and 25 paise coins.
(a) 180   (b) 190
(c) 160   (d) 200

ANS : D

97. An examination consists of 160 questions. One mark is given for every correct option. If one-fourth mark is deducted for every wrong option and half mark is deducted for every question left, then one person scores 79. And if half mark is deducted for every wrong option and one-fourth mark is deducted for every left question, the person scores 76, then find the number of questions he attempted correctly.
(a) 80   (b) 100
(c) 120   (d) 140

ANS : B

98. The number of ordered pairs of different prime numbers whose sum is not exceeding 26 and difference between second number and first number cannot be less than 10.
(a) 8   (b) 9
(c) 10   (d) 11

ANS : D

99. The number of possible pairs of succesive prime numbers such that each of them is greater than 40 and their sum is atmost 100 is
(a) 3   (b) 2
(c) 4   (d) 1

ANS : A

100. In an election the supporters of two candidates A and B were taken to polling both in two different vehicles, capable   of carrying 10 and 15 voters respectively. If atleast 90 vehicles were required   to carry a total of 1200 voters, then find the maximum number of votes by which the elections could be won by the candidates, B.
(a) 900   (b) 600
(c) 300   (d) 500

ANS : B