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Linear equations

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1. $Find\ x, if\ 3x, -\frac{x}{2} = 25$ a) 10 b) 6 c) 3 d) 9
2. $Solve, \frac{4}{x} + \frac{5}{y} = 2, \frac{10}{x} - \frac{5}{y} = \frac{3}{2}$
   $a)\ x = 4, y = 4\ b) x = 4, y = 5$ $c) x = 5, y = 5$ $d) x = 5, y = 4$
3. If $(-3, k)\ is\ a\ solution\ of\ 2x + \frac{y}{4} - 8 = 0, then\ k =?$
   a) 52 b)-56 c)56 d)-52
4. $If\ 5x - 3y + 4 = 0\ and\ x + 2y - 7 = 0, then\ what\ is\ the\ value\ of\ (x + y)$
   a)4 b)-4 c)3 d)-3
5. $If\ x + y - (a - b) = 0\ and\ ax - by - (a^2 + b^2) = 0, then\ the\ value\ of\ (x - y)\ is$
   a)a-b b) ab c) a+b d) a/b
6. $The\ solution\ of\ 2x - y - 3 = 0\ and\ 4x + y - 3 = 0$
   $can\ be\ represented\ by\ a\ point\ in\ the\ coordinate\ plane\ in$
   a) 1st quadrant b) 2nd quadrant c) 3rd quadrant d)4th quadrant
7. $If\ 3x + y = 11\ and\ x + 2y = 7, then\ the\ value\ of\ (2x - 3y)\ is$
   a)1 b)0 c)-1 d)-2
8. $The\ system\ of\ equations\ kx + 3y = 7\ and\ 6x + 2y = 11\ has\ a\ unique\ solution\ when$
   $a) k = 0$ $b) k = 9$ $c) k \neq 9$ $k \neq 0$
9. $Find\ the\ number\ that\ gives\ you\ the\ same\ result\ whether\ you\ divide\ it\ by\ 6\ or\ substract\ 6\ from\ it$
   $a) 7\frac{1}{5}$ $b)\ 7\frac{1}{2}$ $c)\ 7\frac{2}{3}$ $d)\ 7\frac{4}{5}$
10. $Sudha's\ age\ is\ 5\ times\ as\ that\ of\ Sandhya.\ 10\ years\ later\ Sudha's\ age\ will\ be\ thrice\ that\ of\ Sandhya.\ Find\ the\ age\ of\ Sudha\ after\ 10\ year.$
    $a)\ 10yr$ $b)\ 50yr$ $c)\ 60yr$ $d)\ 40yr$
11. $On\ a\ certain\ day, 5030\ people\ visited\ an\ exhibition.$
    $The\ number\ of\ men\ exceeded\ the\ number\ of\ women\ by\ 500. The\ number\ of\ children\ was\ 600\ less\ than\ the\ number\ of\ women. Find\ the\ number\ of\ children\ visitors\ on\ that\ day?$
    $a)\ 1710$ $b)\ 1110$ $c)\ 1740$ $d)\ 1140$
12. $A\ is\ 2\ year\ older\ to\ B, who\ is\ twice\ as\ old\ as\ C. If\ the\ sum\ of\ the\ ages\ of\ A, B\ and\ C\ is\ 37, then\ how\ old\ is\ A?$
    $a)\ 16yr$ $b) 7yr$ $c)\ 14yr$ $d)\ 18yr$
13. Divide 600RS among A, B and C so that B may get 90RS more than A and C may get 30RS more than B. Find the share of C.
    a) 130 Rs. b) 220 Rs. c) 250Rs. d) 270Rs.
14. Avinash spends 40h in completing his assignments in which he had to work on Physics, Chemistry, Biology subjects. Hi spends Y hours on physics, 2Y hours on chemistry and 3Y hours on biology. How many hours did he work on biology?
    a) 20h b) 20/3h c) 40/3h d) 24h
15. At present a father is thrice as old his son, 10 years ago he was 5 times of his son's age. Find the present age of father.
    a) 40yr b) 50yr c) 20yr d) 60yr
16. If 3 numbers are added in pairs. The sums=26, 34, 36 respectively. Find the numbers.
    a) 11,15,19 b) 13,3,31 c)10,16,24 d) 12,14,16
17. The biggest angle in a triangle is equal to the sum of the other two. If the smaller angle differ by $30°$. Find the angle.
    $a)\ 80°, 60°, 40°$ $b) 100°, 60°, 40°$ $c)\ 90°, 60°, 30°$ $d)\ 75°, 65°, 40°$

18. The sum of the digit in a two digit number is 9. When the digits are interchanged the number is increased by 9. Find the number.
    a) 36 b) 54 c) 45 d) 63
19. The total cost of two pens and three books is 40RS. A pen cost 3 and half times a book. Find the price of the pen.
    a) 4Rs b) 14Rs c) 6Rs d) 12Rs
20. A girl bought 10 Stamps of denomination 25p and 50p for 3.50RS. How Many 25 stamps did she buy? a) 6 b) 4 c) 8 d) 2

Answers with Solutions

1. Solution: (a)

$$3x - \frac{x}{2} = 25 \rightarrow \frac{6x - x}{2} = 25 \rightarrow \frac{5x}{2} = 25 \rightarrow 5x = 50 \rightarrow x = 10$$

2. Solution: (b)

$$\frac{4}{x} + \frac{5}{y} = 2, \frac{10}{x} - \frac{5}{y} = \frac{3}{2}$$

$$Let, \frac{1}{x} = a \; and \; \frac{1}{y} = b, we \; get$$

$$4a + 5b = 2$$

$$and \; 10a - 5b = \frac{3}{2}$$

$$Adding \; Eqs. (i) and \; (ii), we \; get$$

$$4a + 5b = 2$$

$$\underline{10a - 5b = \frac{3}{2}}$$

$$14a = \frac{7}{2} \rightarrow a = \frac{1}{4}$$

$$Substituting \; the \; value \; of \; a \; in \; Eq \; (i) we \; get$$

$$Now, a = \frac{1}{4} = \frac{1}{x} \rightarrow x = 4 \; and \; b = \frac{1}{5} = \frac{1}{y} \rightarrow y = 5$$

3. Solution: (c)

$$Clearly, x = -3 \; and \; y = k \; satisfies \; 2x + \frac{y}{4} - 8 = 0$$

$$\therefore 2(-3) + \frac{k}{4} - 8 = 0$$

$$\frac{k}{4} - 14 = 0 \rightarrow k = 56$$

4. Solution: (A)

$$Given, 5x - 3y = -4 \quad \ldots\ldots 1$$

$$x + 2y = 7 \quad \ldots\ldots\ldots 2$$

$$Multiplyng \; Eq. 2 \; by \; 5 \; and \; substracting \; from \; Eq. 1 \; we \; get,$$

$$5x - 3y = -4$$

$$\underline{5x + 10y = 35}$$

$$-13y = -39$$

$$y = 3$$

$$Substituting \; the \; value \; of \; y \; in \; Eq. 1 \; we \; get,$$

$$5x - 3 \times 3 = -4 \rightarrow x = 1 \rightarrow x + y = 4$$

5. Solution: (c)

$$Given, x + y - (a - b) = 0 \rightarrow x + y = a - b \ldots..1$$
$$ax - by - (a^2 + b^2) = 0 \rightarrow ax - by = (a^2 + b^2) \ldots\ldots 2$$
$$Multiplying\ Eq.1\ by\ b\ and\ adding\ we\ get,$$
$$bx + by = ab - b^2$$
$$\underline{ax - by = (a^2 + b^2)}$$
$$x(a + b) = a(a + b)$$
$$x = a$$
$$Substituting\ the\ value\ of\ a\ in\ Eq.1\ we\ get,$$
$$a + y = a - b \rightarrow y = -b \rightarrow x - y = a - (-b) = a + b$$

6. Solution: (d) Given

$$2x - y - 3 = 0 \rightarrow 2x - y = 3 \ldots\ldots 1$$
$$4x + y - 3 = 0 \rightarrow 4x + y = 3 \ldots\ldots 2$$
$$Adding\ Eq.1\ and\ 2\ we\ get$$
$$6x = 6 \rightarrow x = 1$$
$$Substituting\ the\ value\ of\ x = 1\ in\ Eq.1$$
$$2 \times 1 - y = 3 \rightarrow y = -1$$
$$\therefore The\ solution\ can\ be\ represented\ by\ a\ point\ (1, -1)\ which\ lies\ in\ the\ 4th\ quadrant.$$

7. Solution: (b)
Given

$$3x + y = 11 \ldots\ldots 1$$
$$x + 2y = 7 \ldots\ldots 2$$
$$Multiplying\ Eq.1\ by\ 2\ and\ substracting\ Eq.2\ from\ it, we\ get\ x = 3. Substracting\ in\ Eq.2\ we\ get,$$
$$y = 2$$
$$\therefore 2x - 3y = 6 - 6 = 0$$

8. Solution: (C)

$$For\ a\ unique\ solution\ \frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$
$$\frac{k}{6} \neq \frac{3}{2}$$
$$\rightarrow k \neq \frac{3 \times 6}{2} \rightarrow k \neq 9$$

9. Solution: (a)

$$Let\ the\ number\ be\ x$$
$$\frac{x}{6} = x - 6 \rightarrow x = 6x - 36 \rightarrow x = \frac{36}{5} = 7\frac{1}{5}$$

10. Solution: (c)

$$Let\ the\ present\ age\ of\ Sandhya = x\ years$$
$$So, the\ present\ age\ of\ Sudha = 5x\ years$$
$$10\ years\ later\ Sandhya = x + 10\ years$$
$$10\ years\ later\ Sudha = 5x + 10\ years$$
$$\rightarrow 5x + 10 = 3(x + 10) \rightarrow x = 10yr$$
$$Present\ age\ of\ Sudha = 5x = 50\ years$$

$$Age\ of\ Sudha\ after\ 10\ year = 50 + 10 = 60\ years$$

11. Solution: (b)

$$Let\ the\ number\ of\ women\ visitors = x$$
$$The\ number\ of\ men\ visitors = x + 500$$
$$The\ number\ of\ children\ visitors = x - 600$$
$$Also, (Men + Women + Children)\ visitors = 5030$$
$$\rightarrow x + 500 + x + x - 600 = 5030 \rightarrow x = 1710$$
$$The\ number\ of\ children\ visitors = 1710 - 600 = 1110$$

12. Solution: (a)

$$Let\ the\ age\ of\ C = x$$
$$Age\ of\ B = 2x$$
$$Age\ of\ A = 2x + 2$$
$$Also, A + B + C = 37$$
$$\rightarrow 2x + 2 + 2x + x = 37 \rightarrow x = 7$$
$$Age\ of\ A = 2 \times 7 + 2 \rightarrow 16$$

13. Solution: (c)

$$Let, A\ get\ RS\ x$$
$$Then, B\ will\ get\ RS\ (x + 90)$$
$$Then, C\ will\ get\ RS\ [(x + 90) + 30] = x + 120$$
$$Given, A + B + C = 600$$
$$x + x + 90 + x + 120 = 600 \rightarrow x = 130$$
$$Then, C\ will\ get\ RS\ x + 120 \rightarrow 250$$

14. Solution: (a)

$$Time\ spend\ on\ (Physics + Chemistry + Biology) = 40h$$
$$\rightarrow y + 2y + 3y = 40 \rightarrow y = \frac{20}{3}$$
$$Hours\ spend\ on\ biology = 3y = 3 \times \frac{20}{3} = 20$$

15. Solution: (d)

$$Let\ So\ 's\ present\ age = x\ yr$$
$$Father's\ present\ age = 3x\ yr$$
$$Son's\ ag\ \ 10years\ ago = (x - 10)\ yr$$
$$Father's\ age\ 10\ years\ ago = \ (3x - 10)\ yr$$
$$\rightarrow 3x - 10 = 5(x - 10) \rightarrow x = 20$$
$$Father's\ present\ age = 3x = 60$$

16. Solution: (a)

$$Let\ the\ three\ numbers\ be\ x, y, z\ respectively$$
$$x + y = 26 \ldots . .1$$
$$y + z = 34 \ldots \ldots 2$$
$$x + z = 30 \ldots \ldots 3$$
$$From\ Eq. 1\ x = 26 - y \ldots \ldots \ldots .4$$
$$Substituting\ the\ value\ of\ x\ in\ Eq. 3 \rightarrow 26 - y + z = 30$$
$$\rightarrow z - y = 4 \ldots \ldots .5$$
$$Adding\ Eq. 2\ and\ 5\ we\ get\ z = 19$$
$$Substituting\ the\ value\ of\ z\ in\ Eq. 2, we\ get\ y = 15$$
$$Substituting\ the\ value\ of\ y\ in\ Eq. 1\ we\ get\ x = 11$$

$$the\ numbers\ are\ 11,15,19$$

17. Solution: (c)

$$Let\ the\ three\ angles\ be\ a,b,c$$
$$Let\ the\ biggest\ angle\ be\ a$$
$$a+b+c=180\ldots..1$$
$$b+c=a\ldots\ldots2$$
$$b-c=30\ldots..3$$
$$From\ Eq.1\ and\ 2\ we\ get, a=90$$
$$So, Eq.2\ reduces\ to\ b+c=90\ldots\ldots\ldots4$$
$$Adding\ Eq.3\ and\ 4\ we\ get\ b=60$$
$$Substituting\ the\ value\ of\ b\ in\ Eq.3\ we\ get, c=30$$
$$a,b\ and\ c\ are\ 90°, 60°\ and\ 30°\ respectively.$$

18. Solution: (c)

$$Let\ the\ unique\ place=x$$
$$Let\ the\ 10s\ place=y$$
$$number=10y+x$$
$$Also, x+y=9\ldots..1$$
$$On\ interchanging\ digits\ the\ number\ becomes\ 10x+y.$$
$$By\ the\ condition\ (10x+y)-(10y+x)=9$$
$$x-y=1\ldots\ldots..2$$
$$adding\ Eq.1\ and\ 2\ we\ get, x=5. Substituting\ the\ value\ of\ x\ in\ Eq.1\ we\ get\ y=4$$
$$So, the\ number\ is\ 45$$

19. Solution: (b)

$$Let, the\ cost\ of\ a\ pen\ be\ x\ RS$$
$$Let\ the\ cost\ of\ a\ book\ be\ y\ RS$$
$$2x+3y=40\ldots\ldots.1$$
$$x=\frac{7}{2}y\ldots\ldots.2$$
$$Substituting\ the\ value\ of\ x\ in\ Eq.1\ we\ get, y=4$$
$$Substituting\ the\ value\ of\ y\ in\ Eq.2\ we\ get, x=\frac{7\times4}{2}=14$$
$$The\ cost\ of\ the\ pen\ is\ 14\ RS$$

20. Solution: (a)

$$Let\ the\ number\ of\ 25p\ stamps\ bought\ be\ x$$
$$Let\ the\ number\ of\ 50p\ stamps\ bought\ be\ y$$
$$x+y=10\ldots\ldots.1$$
$$Also, 25x+50y=350\rightarrow x+2y=14\ldots\ldots..2$$
$$Substracting\ Eq.1\ from\ Eq.2\ we\ get\ y=4$$
$$Substituting\ the\ value\ of\ y\ in\ Eq.1\ we\ get, x=6$$
$$The\ number\ of\ 25p\ stamps\ bought=6$$