

Simple Equations

1. Solve the equation for x :

$$19(x + y) + 17 = 19(-x + y) - 21$$

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

Explanation:

$$19x + 19y + 17 = -19x + 19y - 21$$

$$38x = -38 \Rightarrow x = -1$$

2. The cost of 10 kg of apples is equal to the cost of 24 kg of rice. The cost of 6 kg of flour equals the cost of 2 kg of rice. The cost of each kg of flour is Rs.20.50. Find the total cost of 4 kg of apples, 3 kg of rice and 5 kg of flour?

(A)Rs.849.50 (B) Rs. 877.40

(C)Rs.901.60 (D) Rs. 815.20

Explanation:

Let the costs of each kg of apples and each kg of rice be Rs.a and Rs.r respectively.

$$10a = 24r \text{ and } 6 * 20.50 = 2r$$

$$a = 12/5 r \text{ and } r = 61.5$$

$$a = 147.6$$

$$\begin{aligned} \text{Required total cost} &= 4 * 147.6 + 3 * 61.5 + 5 * 20.5 \\ &= 590.4 + 184.5 + 102.5 = \text{Rs.}877.40 \end{aligned}$$

3. Three friends, returning from a movie, stopped to eat at a restaurant. After dinner, they paid their bill and noticed a bowl of mints at the front counter. Sita took $\frac{1}{3}$ of the mints, but returned four because she had a momentary pang of guilt. Fatima then took $\frac{1}{4}$ of what was left but returned three for similar reasons. Eswari then took half of the remainder but threw two back into the bowl. The bowl had only 17 mints left when the raid was over. How many mints were originally in the bowl?

(A) 38 (B) 31 (C) 41 (D) 48

Explanation:

Let's the initial count be X

Sita took $\frac{1}{3}$ and returned four \Rightarrow Current count is

$$X - \frac{X}{3} + 4 = \frac{2X}{3} + 4$$

Fatima took $\frac{1}{4}$ and returned three \Rightarrow Current count is $\frac{3}{4} * (\frac{2X}{3} + 4) + 3 = \frac{X}{2} + 3 + 3 = \frac{X}{2} + 6$

Eshwari took half of remaining and returned two $\Rightarrow \frac{1}{2} (\frac{X}{2} + 6) + 2 = \frac{X}{4} + 3 + 2 = \frac{X}{4} + 5$

It is given that $\frac{X}{4} + 5 = 17$

$$\frac{X}{4} = 12$$

$$X = 48$$

4. Using only 2, 5, 10, 25 and 50 paise coins, what will be the minimum number of coins required to pay exactly 78 paise, 69 paise, and Re. 1.01 to three different persons?

(A) 17 (B) 18 (C) 19 (D) 1

Explanation

As we need the minimum number of coins go for the highest denomination first

78 -- $> 50 + 2 \times 10 + 4 \times 2$ (7 coins)

69 -- $> 50 + 10 + 5 + 2 \times 4$ (5 coins)

1.01 -- $> 50 + 25 + 2 \times 10 + 3 \times 2$ (7 Coins)

Total = $7 + 5 + 7 = 19$ coins.

5. The product of two consecutive odd numbers is 4623. Which is the greater of the two numbers?

(A) 66 (B) 69 (C) 68 (D) 67

Explanation:

$$X(X + 2) = 4623$$

$$X^2 + 2X - 4623 = 0$$

$$X^2 + 69X - 67X - 4623 = 0$$

$$(X - 67)(X + 69) = 0$$

$$X = 67, \text{ Greater odd number} = X + 2 \Rightarrow 67 + 2 = 69$$

6. The number obtained by interchanging the digits of a two-digit number is less than the original number by 63. If the sum of the digits of the number is 11, what is the original number?

(A) 29 (B) 92 (C) 74 (D) 83

Explanation:

$$10X + Y - (10Y + X) = 63$$

$$9X - 9Y = 63$$

$$X - Y = 7$$

$$X + Y = 11$$

Solving these equations, we get

$$X = 9, Y = 2$$

$$\text{Required number} = 10X + Y$$

$$\Rightarrow 10 * 9 + 2 = 92$$

7. Shankar is 5 years younger than Ron. Four years later, Ron will be twice as old as Aaron. Find their present ages.

- (A) 1 (B) 2 (C) 4 (D) 5

Explanation:

Let Ron's present age be x .

Then Shankar present age = $x - 5$

After 4 years Ron's age = $x + 4$, Shankar age $x - 5 + 4$.

According to the question;

Ron will be twice as old as Shankar.

Therefore, $x + 4 = 2(x - 5 + 4)$

$$\Rightarrow x + 4 = 2(x - 1)$$

$$\Rightarrow x + 4 = 2x - 2$$

$$\Rightarrow x + 4 = 2x - 2$$

$$\Rightarrow x - 2x = -2 - 4$$

$$\Rightarrow -x = -6$$

$$\Rightarrow x = 6$$

Therefore, Shankar present age = $x - 5 = 6 - 5 = 1$

8. If one-third of a number exceeds its one-fourth by 1, find the number.

(A)10 (B) 11 (C)12 (D) 14

Explanation:

Let the required number be x.

$$\frac{1}{3} (x) - \frac{1}{4} (x) = 1$$

$$x/12 = 1$$

$$x = 12$$

9. Each of the 2 equal sides of an isosceles triangle is twice as large as the third side. If the perimeter of the triangle is 30 cm, find the length of equal side of the triangle.

- (A) 6 (B) 12 (C) 8 (D) 15

Explanation:

Let the length of the third side be x cm.

Each equal side = $2x$ cm.

As per the condition of the question, we have

$$\text{Perimeter} = x + 2x + 2x = 30$$

$$\Rightarrow 5x = 30$$

$$\Rightarrow x = 6$$

Thus, the third side of the triangle = 6 cm

and other two equal sides are $2 \times 6 = 12$ cm each

10. A man when asked how many hens and buffaloes he has told that his animals have 120 eyes and 180 legs. How many hens have he?

(A) 30 (B) 20 (C) 40 (D) 10

Explanation:

Let number of buffaloes = x

The number of hens = y

$$\therefore \text{Total eyes} = 2x + 2y = 120$$

$$\therefore \text{Total legs} = 4x + 2y = 180$$

Solve these Equations we will get,

$$X=30, y=30$$

11. If $(x^2-3x+2)/(x^2-5x+4) = (x^2-6x+8)/(x^2-9x+14)$, then the value of x is
(A) $2\frac{1}{2}$ (B) $\frac{1}{2}$ (C) 2 (D) -2

Explanation:

$$\begin{aligned}(x-2)(x-1)/(x-4)(x-1) &= (x-2)(x-4)/(x-2)(x-7) \\ \Rightarrow x-2/x-4 &= x-4/x-7 \\ \Rightarrow x^2 - 9x + 14 &= x^2 - 8x + 16 \\ \Rightarrow x &= -2\end{aligned}$$

12. The distance between two stations is 340 km. two trains start simultaneously from these stations on parallel tracks to cross each other. The speed of one of them is greater than that of other by 5 km/h. If the distance between the two trains after 2 hours of their start is 30 km, then the speed of each train are

- (A) 75 km/h, 80 km/h (B) 60 km/h, 65 km/h
(C) 80 km/h, 85 km/h (D) 55km/h, 60km/h

Explanation:

Let speed of first train = x km/h and speed of second train = $x + 5$ km/h

Distance travelled in 2 h by first train = $2x$ km/h

Distance travelled in 2 h by second train = $(x + 5) * 2$ km

As $2x + (2x + 10) + 30 = 340$

$$\Rightarrow 4x = 340$$

$$\Rightarrow x = 75$$

Speed of first train = 75 km/h and speed of second train = 80 km/h.

13. The sum of two numbers is 2490 and if 6.5% of one number is equal to 8.5% of the other, then numbers are

(A) 1414, 1076 (B) 1411, 1079

(C) 1412, 1078 (D) 1413, 1077

Explanation:

Let the numbers be x and $2490 - x$

6.5 % of one = $(6.5/100) * x = (13x/200)$

8.5 % of other number = $(8.5/100)(2490 - x) = (17/200)(2490 - x)$

By condition, $(13x/200) = ((17/200)(2490-x))$

$$\Rightarrow 13x = 17(2490 - x)$$

$$\Rightarrow 13x + 17x = 42330$$

$$\Rightarrow x = (42330/30) = 1411$$

Second number = $2490 - 1411 = 1079$

14. Three prizes are to be distributed in a quiz contest. The value of the second prize is five-sixth of the value of the first prize and the value of the third prize is four-fifth of that of the second prize. If the total value of the three prizes is Rs.150, then the value of second price is

(A) 40 (B) 50 (C) 60 (D) 70

Explanation:

Let the value of first prize be Rs.x

Value of second prize = Rs. $(\frac{5}{6})x$

Value of third prize = $(\frac{4}{5})[(\frac{5}{6})x] = \text{Rs } (\frac{2}{3})x$

as $(\frac{2}{3})x + (\frac{5}{6})x + x = 150$

$$\Rightarrow 15x/6 = 150 \Rightarrow x = 60$$

\Rightarrow Hence, value of first prize = Rs.60

\Rightarrow Value of second prize = $(\frac{5}{6}) * 60 = \text{Rs.}50$

\Rightarrow Value of third prize = $(\frac{2}{3}) * 60 = \text{Rs.}40$

15. Two planes start from a city and fly in opposite directions, one averaging a speed of 40 km/h greater than the other. If they are 3400 km apart after 5 hours, the average speeds respectively are

(A) 330, 370 km/h (B) 320, 360 km/h

(C) 250, 290 km/h (D) 300, 340 km/h

Explanation:

Let average speed of one plane be x km/h

Then average speed of other plane be $(x + 40)$ km/h

Distance travelled by first plane in 5 hours = $5x$ km

Distance travelled by second plane in 5 hours = $5(x + 40)$ km

So, $5x + 5(x + 40) = 3400$

$10x + 200 = 3400$

$10x = 3200$

$x = 3200/10 = 320$ km/hr

so, average speed of second plane = $320 + 40 = 360$ Km/h

16. Sunita has 10 paise and 50 paise coins in her purse. If the total number of coins is 17 and their total value is Rs. 4.50, then the number of 10 paise coins is

- (A) 9 (B) 7 (C) 10 (D) 5

Explanation:

Let number of 10 paise coins be x and number of 50 paise coins be y

$$\text{Then, } x + y = 17 \quad \dots(i)$$

$$\text{and } 10x + 50y = 450 \quad \dots(ii)$$

$$\text{from eq (ii) } x + 5y = 45 \quad \dots(iii)$$

subtracting eq (i) and (iii), we get

$$4y = 28$$

$$y = (28/4) = 7$$

$$\text{Number of 10 paise coins} = y = 17 - x = 17 - 7 = 10$$

17. Reshma has pens and pencils which together are 40 in number. If she had 5 more pencils and 5 less pens, the number of pencils would have become 4 times the number of pens. Then, the original number of pencils Reshma had:

- (A) 19 (B) 27 (C) 13 (D) 17

Explanation:

Let the original number of pens be x and original number of pencils be y .

As, $x + y = 40$... (i)

and $(y + 5) = 4(x - 5)$... (ii)

From eq. (i) $y = 40 - x$

Put in eq. (ii) $(40 - x) + 5 = 4(x - 5)$

$$\Rightarrow 45 - x = 4x - 20$$

- $\Rightarrow -5x = -65$

- $\Rightarrow x = 13$

\therefore Original number of pencils $= 40 - 13 = 27$

18. The ratio between the present ages of X and Y is 5:7 respectively. If the difference between Y's present age and X's age after 6 years is 2, what is the total of X's and Y's present ages?

- (A) 48 years (B) 52 years
(C) 56 years (D) 60 years

Explanation:

Let the present ages of X and Y be $5x$ years and $7x$ years respectively.

Then, $7x - (5x + 6) = 2 \iff 2x = 8 \iff x = 4$

\therefore Required sum $= 5x + 7x = 12x = 48$ years.

19. A number consists of two digits. The digit in the tens place is twice the digit in the units place. If 18 be subtracted from the number, the digits are reversed. Find the number.

(A) 44 (B) 42 (C) 24 (D) 84

Explanation:

Let "x" be the digit in units place.

Then, the digit in the tens place = $2x$

So, the number is $(2x)x$.

If 18 be subtracted from the number, the digits are reversed.

So, we have $(2x)x - 18 = x(2x)$

$$10 \cdot (2x) + 1 \cdot x - 18 = 10 \cdot x + 1 \cdot (2x)$$

$$\text{Simplify. } 20x + x - 18 = 10x + 2x$$

$$21x - 18 = 12x, \quad 9x = 18, \quad x = 2$$

units place is 2, tenth place is =4

Hence the number is 42

20. The denominator of a fraction is greater than the numerator by 8. If the numerator is increased by 17 and denominator is decreased by 1, the number obtained is $\frac{3}{2}$. Find the fraction.

(A) $\frac{21}{13}$ (B) $\frac{13}{21}$ (C) $\frac{33}{25}$ (D) $\frac{25}{33}$

Explanation:

Let numerator of a fraction be x .

Denominator = $(x + 8)$

Fraction = Numerator/Denominator = $\frac{x}{x+8}$

According to the question,

$$\frac{(x + 17)}{(x + 8 - 1)} = \frac{3}{2}$$

$$\frac{(x + 17)}{(x + 7)} = \frac{3}{2}$$

$$2(x + 17) = 3(x + 7)$$

$$2x + 34 = 3x + 21$$

$$3x - 2x = 34 - 21$$

$$x = 13$$

Numerator = $x = 13$ And

$$\text{Denominator} = X + 8 = 13 + 8 = 21$$

Fraction = $\frac{13}{21}$