1.
Hint: We will be using the concept of percentage to tackle this question. We will assume the maximum number of marks to be x. Student got 40 marks and he failed by 40 marks so the total mass required to pass is 80 which means 40% of the maximum marks is equal to 80.

Complete step-by-step answer:
Let the maximum number of marks be x.
Also if we have to turn a percentage into a fraction we will just divide by 100.
Here it is mentioned in the question that the student got 40 marks and he failed by 40 marks. Using this information, we get,
Marks achieved by the student

$$=40……(1)=40……(1)$$

Marks by which the student failed

$$=40……(2)=40……(2)$$

So adding equation (1) and equation (2) we get the total marks needed to pass.
Marks required to pass

$$=40+40=80……(3)=40+40=80……(3)$$

It is also mentioned in the question that the student has to secure 40% marks to pass, so using this information we get,

$$\Rightarrow 40 \Rightarrow 40$$

Now changing the percentage into fraction in equation (4) we get,

$$\Rightarrow (40/100) \times x=80………(5)$$

Solving for x in equation (5) we get,

$$\Rightarrow x=80\times(100/40)=200$$

Hence 200 is the maximum marks and so option (c) is the right answer.

2.

Correct option is A)

Let the three consecutive even numbers be $2x-2, 2x, 2x+2$.
We have,

$(2x-2)+2x+(2x+2)=234$

$\Rightarrow 6x=234$

$\Rightarrow x=39$

$\therefore$ Least even number is $2x-2=2(39)-2=76$.

3.

Let the two angles of the triangle be 4x and 5x.

Then, as per the question, we know

third angle = 4x + 5x = 9x

We know that sum of all the angles of a triangle is 180°.

$\therefore$ 4x + 5x + 9x = 180°

$\Rightarrow$ 18x = 180°

$\Rightarrow$ x = 10°   ....[On dividing both sides by 18]

So, first angle = 4x° = 4 × 10° = 40°,

second angle = 5x° = 5 × 10° = 50° and

and third angle = 9x° = 9 × 10° = 90°

4.

Correct option is B)

Let the number of males =7x and number of Females =4x

Given that,

$7x=84 \Rightarrow x=12$

Total number of members =7x+4x=11x=11×12=132

5.

Correct option is A)

Let cost of scooter = 9x

and Let cost of cycle = 5x

We have, 9x - 5x = 4,200

x = 1,050

∴ cost price of cycle = 5 × 1,050 = Rs. 5,250

6.

Correct option is C)

The two numbers are in the ratio 3:8.

Let the numbers be 3x and 8x.

Their difference is 115.

Thus 8x−3x=115

⇒5x=115

⇒x=23

Largest number is 8x=8 × 23=184.


7.

Correct option is B)

Given, 351=2x+7x

⇒9x=351

⇒x=39

Two parts of 351 are

2x=78

7x=273

Product of the numbers is =78×273=21294.

8.

Let the original number be x.

According to the question we can write as (2/3)x+20x

On rearranging x−(2/3)x=20

Now taking the L.C.M od 1 and 3 is 3

(3x−2x)/3=20

x/3=20

Again by transposing x=60

So the original number is 60

9.

## Let the numbers be x

so , 10 + 4x = 5x - 5

$\Rightarrow 10+5=5x-4x$

$\Rightarrow 15=x$

∴ the numbers is 15.

10.

10

$\sqrt{3}\ x = 2\sqrt{3} + x$

$\sqrt{3}\ x - x = 2\sqrt{3}$

$\Rightarrow x(\sqrt{3} - 1) = 2\sqrt{3}$

$\Rightarrow x = \dfrac{2\sqrt{3}}{\sqrt{3} - 1}$

Apply the Rationalisation

$x = \dfrac{2\sqrt{3}}{\sqrt{3} - 1} \cdot \dfrac{\sqrt{3} + 1}{\sqrt{3} + 1}$

$= \dfrac{2\sqrt{3}(\sqrt{3} + 1)}{3 - 1}$

$= \dfrac{2\sqrt{3}(\sqrt{3} + 1)}{2} = 3 + \sqrt{3}$

Ans: A

11.

Correct option is C)

Given, a number increased by 8% of itself gives 135.

Thus, $x + 8\%$ of $x = 135$

$\Rightarrow \dfrac{108x}{100} = 135$

$\Rightarrow x = 135 \times \dfrac{100}{108} = 125$

Thus the number is 125.

12.

Correct option is A)

Let $CP = x$

$Gain = \dfrac{16}{100}x = \dfrac{4x}{25}$

$SP = \dfrac{4x}{25} + x = \dfrac{29x}{25}$

$\dfrac{29x}{25} = 1,885$

$x = Rs.\ 1,625$

13.

$(x + 4)^2 - (x - 5)^2 = 9$

$(x^2 + 16 + 8x) - (x^2 + 25 - 10x) = 9$

$-9 + 18x = 9$

$\Rightarrow 18x = 18 \Rightarrow x = 1$

14.

Given angles of triangles are in ratio 2:3:4.

Let the angles of triangle be x,y,z.

$x : y : z = 2 : 3 : 4$

$\Rightarrow x = 2k, y = 3k, z = 4k$

$x + y + z = 180°$ $\quad$ (∵ sum of angles of a triangle is 180°)

$\Rightarrow x + y + z = 2k + 3k + 4k = 180°$

$\Rightarrow 9k = 180°$

$\Rightarrow k = \dfrac{180°}{9} = 20°$

$x = 2k = 40°$

$y = 3k = 60°$

$z = 4k = 80°$

Difference between highest and smallest is 80°- 40°= 40°..

15.

Correct option is A)

Lets say x is the multiple of 3

Next consecutive multiple of 3 will be (x+3)

Given sum is =51

⇒x+x+3=51

⇒2x=48

⇒x=24

Two consecutive multiples of 3 are 24,27.

16.

Given $(x - 5)/2 - (x - 3)/5 = 1/2$

Now by taking L.C.M for 5 and 2 is 10

$$\Rightarrow \frac{(5(x - 5) - 2(x - 3))}{10} = 1/2$$

By transposing the above equation we can write as

$\Rightarrow (5x - 25 - 2x + 6) = 10/2$

$\Rightarrow 3x - 19 = 5$

Again by transposing

$\Rightarrow 3x = 19 + 5 = 24$

$\Rightarrow x = 24/3 = 8$

17.

17. $\quad \dfrac{2x-1}{3x-4} = \dfrac{3}{4}$

$\Rightarrow \quad 4(2x-1) = 3(3x-1)$

$\Rightarrow \quad 8x - 4 = 9x - 3$

$\Rightarrow \quad -4 + 3 = 9x - 8x$

$\Rightarrow \quad \boxed{x = -1}$

Ans: B

18.

Correct option is B)

Let the required number be x.

So, as per the question, we have

$$\frac{3x}{4} - \frac{3x}{14} = 150$$

$$\Rightarrow \frac{21x - 6x}{28} = 150$$

$$\Rightarrow x = \frac{150 \times 28}{15} = 280$$

Thus, the given number is 280.

19.

Correct option is D)

Let the number be x.

According to the given condition,

$$\left(\frac{2}{3} \times x\right)\left(\frac{3}{4} \times x\right) = 338$$

$$\Rightarrow \frac{1}{2}x^2 = 338$$

$$\Rightarrow x^2 = 676$$

$$\Rightarrow x = \sqrt{676} = \pm 26.$$

so the required number is ±26.

20.

Correct option is B)

Let my present age be x years

Twenty years ago my age was = $(x - 20)$ years

According to the given condition,

$x - 20 = \dfrac{1}{3} \times x$

$\Rightarrow 3(x - 20) = x$     [By cross $-$ multiplication]

$\Rightarrow 3x - 60 = x$

$\Rightarrow 3x - x = 60$

$\Rightarrow 2x = 60$

$\Rightarrow x = 30$

Hence, my present age is 30 years.

21.

Correct option is D)

$3\dfrac{1}{x} \times 3\dfrac{3}{4} = 12\dfrac{1}{2}$

$\dfrac{3x + 1}{x} \times \dfrac{15}{4} = \dfrac{25}{2}$

$10x = 9x + 3$

$x = 3$

22.

Correct option is B)

let total number of votes were x

one got 62% of x

since only two candidates were there, so other got 38% of x

$.62x - .38x = 144$

$0.24x = 144$

$x = 600$

23.

Correct option is B)

Let the number be x

According to the question :

$\Rightarrow \dfrac{75}{100} \times x + 75 = x$

$\Rightarrow 75x + 7500 = 100x$

$\Rightarrow 7500 = 100x - 75x$

$\Rightarrow 7500 = 25x$

$x = 300$

The number is 300.

24.

24. Let the Ravi's present age $= x$.

According to given problem.

$$x + 15 = 4(x - 15)$$
$$\Rightarrow x + 15 = 4x - 60$$
$$\Rightarrow 15 + 60 = 4x - x$$
$$\Rightarrow 3x = 75$$
$$\Rightarrow x = \frac{75}{3} = 25$$

$$x = 25$$

25.

Correct option is B)

Let age of Dilip and his son be x,y respectively

Given,two years ago Dilip was three times as old as his son.
⇒age of Dilip was x−2 and his son was y−2.
x−2=3(y−2)
2x=6y−8...........(i)

Given, two years hence Dilip will be five times as old as his son.
⇒age of Dilip was x+2 and his son was y+2.

2(x+2)=5(y+2)

2x=5y+6...........(ii)

Equating (i) and (ii),we get

6y−8=5y+6

y=6+8=14

Substituting value of y in (i)

x=3y−4=3(14)−4=42−4=38

∴ the age of Dilip is 38 years.

26.

The given system of equations can be written as:

2x + 3y - 5 = 0 and 4x + 6y - 15 = 0

The given equations are of the following form:

$a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$

Here, $a_1 = 2$, $b_1 = 3$, $c_1 = -5$, $a_2 = 4$, $b_2 = 6$ and $c_2 = -15$

$$\therefore \frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}, \frac{b_1}{b_2} = \frac{3}{6} = \frac{1}{2} \text{ and } \frac{c_1}{c_2} = \frac{-5}{-15} = \frac{1}{3}$$

$$\therefore \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

**Hence, the given system has no solution.**

27.

27. Given System of equations

$$x + 2y - 6 = 0$$

$$3x + 6y - 18 = 0$$

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$\frac{1}{3} = \frac{2}{6} = \frac{-6}{-18}$$

The system has infinitely many solutions.

Ans: C

28.

The correct option is **B**

(3, 2)

2x-5y+4=0...(I)
2x+y-8=0...(II)
From the equation II we get,
y=-2x+8
Substituting this value of y in equation II we get,
2x-5(-2x+8)+4=0
⇒12x -36=0
⇒x=3
Substituting this value of x in equation II we get,
y=2
Hence the solution is (3, 2).

29.

Correct option is B)

for unique solution

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \Rightarrow \frac{1}{3} \neq \frac{-2}{k}$$

$$\Rightarrow \boxed{k \neq -6}$$

30.

Correct option is A)

For a system of equations $a_1x + b_1y + c_1 = 0$; $a_2x + b_2y + c_2 = 0$ to have no solution, the condition to be satisfied is

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\Rightarrow \frac{1}{5} = \frac{2}{k} \neq \frac{-3}{7}$$

∴ For k = 10, the given system of equation has no solution.

31.

31.  Given system of equations

$$5x + 2y - 3k = 0$$

$$2(k+1)x + ky - (3k+4) = 0$$

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$

$$\frac{5}{2(k+1)} = \frac{2}{k} = \frac{+3k}{+(3k+4)}$$

$$5k = 4(k+1)$$

$$5k = 4k+4$$

$$\boxed{k = 4}$$

$$\frac{2}{4} = \frac{3 \cdot 4}{12+4}$$

$$\frac{2}{4} = \frac{1 \not{2} \; 3}{16 \; 4}$$

$$\frac{2}{4} \neq 3/4$$

Ans: D (none)

32.

32. Given system of equations

$$8x + 5y - 9 = 0$$
$$kx + 10y - 15 = 0$$

For inconsistent,

if $\cdot \dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

$$\dfrac{8}{k} = \dfrac{5}{10} \neq \dfrac{-9}{-15}$$

$$5K = 80$$
$$\boxed{K = 16}$$

For $k = 16$, the system is inconsistent.

Ans: D

33.

for non-zero solution

$\dfrac{a_1}{a_2} \equiv \dfrac{b_1}{b_2}$

$\Rightarrow \dfrac{5}{2} \equiv \dfrac{-3}{k}$

$\Rightarrow \boxed{k \equiv \dfrac{-6}{5}}$

34.

Correct option is C)

Given that, man is 5 years older than his wife and wife is thrice as old as daughter.

Daughter is 10 years old.

Let the man's age be M, wife's age be W and daughter's age be D.

Thus according to given condition, we have

M = W + 5 ....(1),

W = 3D ....(2)

and D = 10 ....(3)

Putting d = 10 in equation (2), we get

W = 3D = 3 × 10 = 30

Put W = 30 in equation (1), we get

M = W + 5 = 30 + 5 = 35

So, man's age when his daughter was born will be 35 − 10 = 25 years.

35.

Correct option is A)

If B is the original number of boys and G the original number of girls, then

$\dfrac{B}{G-15} = 2, \dfrac{B-45}{G-15} = \dfrac{1}{5} \therefore G = 40.$