*** Answer The Following Questions In One Sentence.[1 Marks Each]** **[1]**

1. What is the total volume of this purple paint?

Ans. : self

*** Questions With Calculation.[2 Marks Each]** **[6]**

2. To make a special shade of purple, paint must be mixed in the ratio, Red : Blue : White :: 2 : 3 : 5. If Yasmin has 10 litres of white paint, how many litres of red and blue paint should she add to get the same shade of purple?

Ans. : self

3. Fill in the empty cells if x and y are in inverse proportion.

x	16	12		36
y	9		48	

Ans. :

x	16	12	x_3	36
y	9	y_2	48	y_4

$\because$ x and y are in inverse proportion.

$\therefore \quad 16 \times 9 = 12 \times y_2$

$$\Rightarrow \quad y_2 = \frac{{}^{4}\cancel{16} \times \cancel{9}^{3}}{\cancel{12}_{\,1}} = 12$$

$\therefore \quad 16 \times 9 = x_3 \times 48$

$$\Rightarrow \quad x_3 = \frac{{}^{1}\cancel{16} \times \cancel{9}^{3}}{\cancel{48}_{\,3}} = 3$$

And $\quad 16 \times 9 = 36 \times y_4$

$$\Rightarrow \quad y_4 = \frac{{}^{4}\cancel{16} \times \cancel{9}}{\cancel{36}_{\,4}} = 4 \quad \Rightarrow y_4 = 4$$

4. Fill in the average number of hours each living being sleeps in a day by looking at the charts. Select the appropriate hours from this list : 15,2.5,20,8,3.5,13,10.5,18.

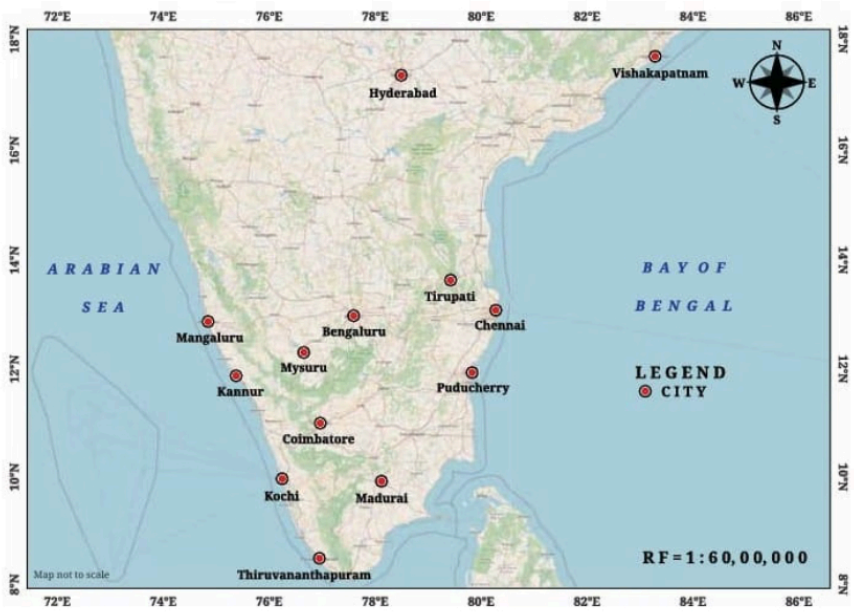
Ans. : Common Sleep Patterns:
Average no. of hours a giraffe sleeps = 2.5 hours
Average no. of hours an elephant sleeps = 3.5 hours
Average no. of hours a boy sleeps = 8 hours
Average no. of hours a dog sleeps = 10.5 hours
Average no. of hours a cat sleeps = 13 hours
Average no. of hours a squirrel sleeps = 15 hours
Average no. of hours a snake sleeps = 18 hours
Average no. of hours a bat sleeps = 20 hours

*** Questions With Calculation.[3 Marks Each]** **[51]**

5. Convert 60,00,000 cm to kilometres.

Ans. : self

6. Using the map given, can you find the geographical distance between Bengaluru and Chennai? Also, find the geographical distance between Mangaluru and Chennai.



Ans. : self

7. Try to find the distances between the same two pairs of cities with different maps that have different scales (ratios). Do they all give the same geographical distance, approximately?

Ans. : self

8. A cricket coach schedules practice sessions that include different activitles in a specific ratio- time for warm-up/cool-down : time for batting : time for bowiling : time for fielding : $3 : 4 : 3 : 5$.
If each session is 150 minutes long, how much time is spent on each activity?

Ans. : Given, time for warm-up/cool-down : time for batting : Time for bowling : time for fielding :: 3 : 4 : 3 : 5

Total number of ratio parts = 3 + 4 + 3 + 5 = 15

Total time of each session = 150 minutes

So, time for warm-up/cool-down = $\frac{3}{15} \times 150 = 30$ minutes

Time for batting $= \frac{4}{15} \times 150 = 40$ minutes

Time for bowling $= \frac{3}{15} \times 150 = 30$ minutes

Time for fielding $= \frac{5}{15} \times 150 = 50$ minutes

Verification: 30 + 40 + 30 + 50 = 150 minutes

9. A school library has books in different languages in the following ratio no. of Odiya books: no. of Hindi books : no. of English books : $3 : 2 : 1$. If the library has 288 Odiya books, how many Hindi and English books does it have?

Ans. : Given, No. of Odiya books : No. of Hindi books : No. of English books : $3 : 2 : 1$

Let x be the total number of books.

No. of Odiya books $= \frac{3}{6} \times x$

$\Rightarrow 288 = \frac{3}{6} \times x$

$\Rightarrow x = 576$

$\therefore$ No. of Hindi books $= \frac{2}{6} \times 576 = 192$

and no. of English books $= \frac{1}{6} \times 576 = 96$

10. I have 100 coins in the ratio- no. of ₹10 coins : no. of ₹5 coins : no. of ₹2 coins : no. of ₹1 coins :: $4 : 3 : 2 : 1$. How much money do I have in coins?

Ans. : Given no. of ₹ 10 coins : no. of ₹ 5 coins : no. of ₹ 2 coins : no. of ₹ 1 coins :. 4 : 3 : 2 : 1.

Total number of coins = 100

Total number of ratio parts = 4 + 3 + 2 + 1 = 10

no. of ₹ 10 coins $= \frac{4}{10} \times 100 = 40$

no. of ₹ 5 coins $= \frac{3}{10} \times 100 = 30$

no. of ₹ 2 coins $= \frac{3}{10} \times 100 = 30$

no. of ₹ 1 coins $= \frac{1}{10} \times 100 = 10$

Total money = 40 × 10 + 30 × 5 + 2 × 20 + 1 × 10

= 400 + 150 + 40 + 10

= ₹ 600

11. Construct a triangle with side lengths in the ratio $3 : 4 : 5$. Will all the triangles drawn with this ratio of sidelengths be congruent to each other? Why or why not?

Ans. : We can construct triangles with sides in the ratio 3 : 4 : 5.

They will not be congruent to each other.

Reason:

Triangle 1: Let sides 3 cm, 4 cm, 5 cm

Triangle 2: Let sides 6 cm, 8 cm, 10 cm

Triangle 3: Let sides = 9 cm, 12 cm, 15 cm

Though all these triangles have the same ratio (3 : 4 : 5), their actual sizes are different.

Congruent triangles must have the same shape and size.

These triangles have the same shape (they are similar) but different sizes.

Hence, they are not congruent.

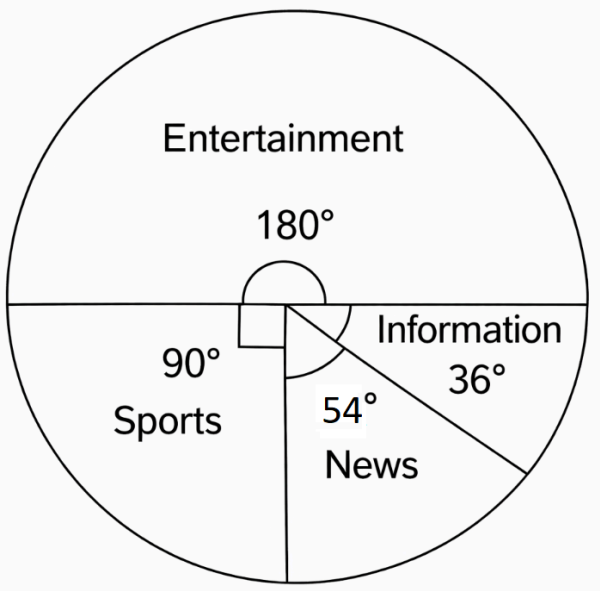
12. Draw a pie chart based on the following information about viewers' favourite typ of TV channel: Entertainment-50%, Sports-25%, News-15%, Information-10%.

Ans. : Given, Entertainment = 50%

Sports = 25%

News = 15%

Information = 10%



Angle for entertainment $= 50\%$ of 360°

$= \frac{50}{100} \times 360^\circ$

$= 180^\circ$

Angle for sports $= 25\%$ of 360°

$= \frac{25}{100} \times 360^\circ$

$= 90^\circ$

Angle for news $= 15\%$ of 360°

$= \frac{15}{100} \times 360^\circ$

$= 54^\circ$

Angle for information $= 10\%$ of 360°

$= \frac{10}{100} \times 360^\circ$

$= 36^\circ$

Verification: $180^\circ + 90^\circ + 54^\circ + 36^\circ = 360^\circ$

13. Which of these are in inverse proportion?

i.

x	40	80	25	16
y	20	10	32	50

ii.

x	40	80	25	16
y	20	10	32	50

iii.

x	30	90	150	10
y	15	5	3	10

Ans. : self

14. If 24 pencils cost ₹120, how much will 20 such pencils cost?

Ans. : The number of pencils and the cost of pencils are in direct proportion.

If x is the required cost, then

$\frac{24}{20} = \frac{₹120}{x}$

$\Rightarrow x \times 24 = ₹120 \times 20$

$\Rightarrow x = ₹100$

So, the cost of 20 such pencils is ₹ 100

15. A tank on a building has enough water to supply 20 families living there for 6 days. If 10 more families move in there, how long will the water last? What assumptions do you need to make to work out this problem?

Ans. : The number of families and the number of days are in inverse proportion.

Assumptions needed

(i) All families use the same amount of water.

(ii) Water usage per family per day is constant.

(iii) No additional water is added to the tank.

Let the water last for x days.

So, $20 \times 6 = 30 \times x$

$\Rightarrow x = 4$

So, the water will last for 4 days.

16. Three workers can paint a fence in 4 days. If one more worker joins the team, how many days will it take them to finish the work? What are the assumptions you need to make?

Ans. : When the number of workers increases, the number of days needed to paint the fence decreases.

Assumptions Needed

(i) All workers work at the same speed/rate.

(ii) The work is uniformly distributed among all workers.

(iii) All workers work for the same number of hours each day.

So, the number of workers and the number of days are in inverse proportion.
Let x be the no. of days taken.

$3 \times 4 = 4 \times x$

$\Rightarrow x = 3$

So, they will take 3 days to finish the work.

17. It takes 6 hours to fill 2 tanks of the same size with a pump. How long will it take to fill 5 such tanks with the same pump?

Ans. : No. of hours and no. of tanks are in direct proportion.
Let 5 such tanks take x hours.

$\frac{6}{2} = \frac{x}{5}$

$\Rightarrow x = 15$

So, 5 tanks will take 15 hours.

18. A given set of chairs are arranged in 25 rows, with 12 chairs in each row. If the chairs are rearranged with 20 chairs in each row, how many rows does this new arrangement have?

Ans. : No. of rows and no. of chairs in each row are in inverse proportion.
Let the new arrangement have x rows.

$25 \times 12 = x \times 20$

$\Rightarrow x = 15$

So, the new arrangement has 15 rows.

19. A school has 8 periods a day, each of 45 minutes duration. How long is each period, if the school has 9 periods a day, assuming that the number of school hours per day stays the same?

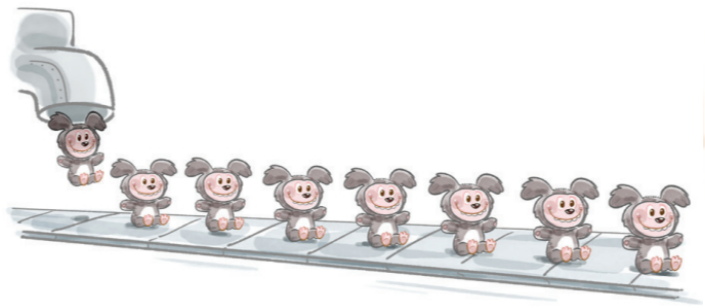
Ans. : No. of periods and the duration of each period are in inverse proportion.
Let each period be of x minutes.

$8 \times 45 = 9 \times x$

$\Rightarrow x = 40$

So, each period is 40 minutes.

20. A factory requires 42 machines to produce a given number of toys in 63 days. How many machines are required to produce the same number of toys in 54 days?



Ans. : No. of machines and no. of days are in inverse proportion.

$42 \times 63 = x \times 54$

$\Rightarrow x = 49$

So, 49 machines are required.

21. A car takes 2 hours to reach a destination, travelling at a speed of 60 km/h. How long will the car take if it travels at a speed of 80 km/h?

Ans. : Let the car take t hours.

The speed of the car and the time taken are in inverse proportion.

So, 2 × 60 = t × 80

⇒ t = 1.5 hour

So, the car will take 1.5 hours.

*** Questions With Calculation.[5 Marks Each]** **[30]**

22. Puneet has only 2 red chillies in his kitchen. But he wants to make spice mix powder that tastes the same as Viswanath's spice mix powder. How much of the other ingredients should Puneet use to make his spice mix powder?

Ans. : self

23. Can you construct a triangle with side lengths in the ratio 1 : 3 : 5? Why or why not?

Ans. : For a triangle to exist, it must satisfy the triangle inequality theorem, which states:

The sum of any two sides of a triangle must be greater than the third side.

Let's take

Side 1 = 1 cm

Side 2 = 3 cm

Side 3 = 5 cm

1. $1 + 3 < 5 \Rightarrow 4 > 5$ (No)
2. $1 + 5 > 3 \Rightarrow 6 > 3$ (Yes)
3. $3 + 5 > 1 \Rightarrow 8 > 1$ (Yes)

Since the first condition fails ($1 + 3 = 4 < 5$)

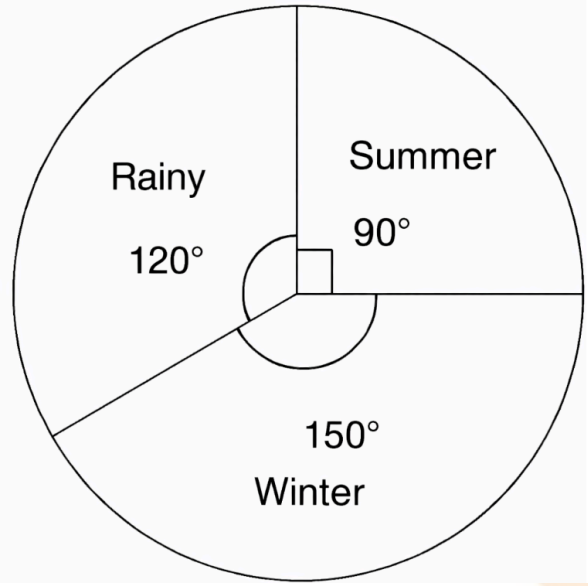
We can't construct a triangle with these sidelengths.

24. A group of 360 people were asked to vote for their favourite season from the three seasons-rainy, winter and summer. 90 liked the summer season, 120 liked the rainy season, and the rest liked the winter. Draw a pie chart to show this information.

Ans. : Given, total people = 360

90 people liked the summer season.

120 people liked the rainy season.



$\therefore$ People liked winter season $= 360$ - $(120 + 90) = 150$

So, angle for summer season $= \frac{90}{360} \times 360^\circ = 90^\circ$

Angle for rainy season $= \frac{120}{360} \times 360^\circ = 120^\circ$

Angle for winter season $= \frac{150}{360} \times 360^\circ = 150^\circ$

Verification: $90 + 120 + 150 = 360^\circ$

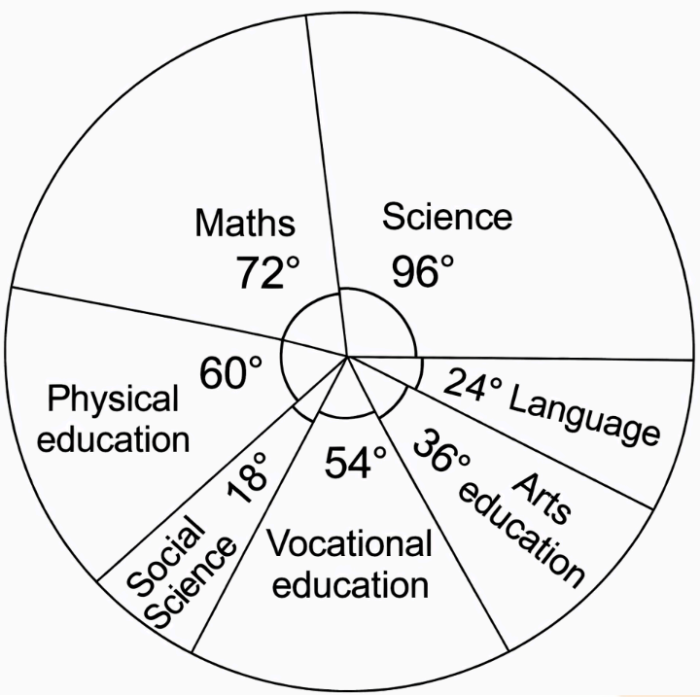
25. Prepare a pie chart that shows the favourite subjects of the students in your class. You can collect the data of the number of students for each subject shown in the table (each student should choose only one subject). Then write these numbers in the table and construct a pie chart:

Subject	Language	Arts Education	Vocational Education	Social Science	Physical Education	Maths	Science
Number of Students							

Ans. :

Subject	Language	Arts Education	Vocational Education	Social Science	Physical Education	Maths	Science
Number of Students	4	6	9	3	10	12	16

Total number of students = 4 + 6 + 9 + 3 + 10 + 12 + 16 = 60



Angle for Language $= \frac{4}{60} \times 360^\circ = 24^\circ$

Angle for Arts Education $= \frac{6}{60} \times 360^\circ = 36^\circ$

Angle for Vocational Education $= \frac{9}{60} \times 360^\circ = 54^\circ$

Angle for Social Science $= \frac{3}{60} \times 360^\circ = 18^\circ$

Angle for Physical Education $= \frac{10}{60} \times 360^\circ = 60^\circ$

Angle for Maths $= \frac{12}{60} \times 360^\circ = 72^\circ$

Angle for Science $= \frac{16}{60} \times 360^\circ = 96^\circ$

26. Which of the following pairs of quantities are in inverse proportion?
    i. The number of taps filling a water tank and the time taken to fill it.
    ii. The number of painters hired and the days needed to paint a wall of fixed size.
    iii. The distance a car can travel and the amount of petrol in the tank.
    iv. The speed of a cyclist and the time taken to cover a fixed route.
    v. The length of cloth bought and the price paid at a fixed rate per metre.
    vi. The number of pages in a book and the time required to read it at a fixed reading speed.

Ans. : i. More taps → Less time to fill the tank
Fewer taps ⟶ More time to fill the tank
The quantities change in opposite directions by the same factor. If we double the no. of taps, the time taken becomes half. Hence, they are in inverse proportion.
ii. More painters → Fewer days needed
Fewer painters → More days needed.
If we double the no. of painters, the work gets done in half the time.
Hence, they are in inverse proportion.
iii. Petrol → It decreases
Distance → It increases

When distance increases, then petrol decreases, so they are in inverse proportion.

iv. Higher speed → Less time taken

Lower speed → More time taken

For a fixed distance, if speed doubles, time becomes half.

Hence, they are in inverse proportion.

v. More cloth → More price to pay

Less cloth → Less price to pay

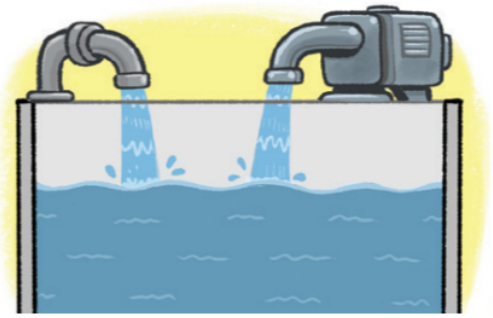
Both quantities decrease together and increase together, so they are in direct proportion.

vi. More pages → More time to read

Fewer pages → Less time to read

Both quantities decrease together and increase together, so they are in direct proportion.

27. A small pump can fill a tank in 3 hours, while a large pump can fill the same tank in 2 hours. If both pumps are used together, how long will the tank take to fill?



Ans. : Let x litres be the capacity of the tank.

Then, water filled by small tank in one hour $= \frac{x}{3}$ litre

Water filled by large tank in one hour $= \frac{x}{2}$ litre

So, total water filled by both pumps in one hour $= \left(\frac{x}{3} + \frac{x}{2}\right)$ litre $= \frac{5x}{6}$ litre

$\therefore$ Time taken by both pumps used together to fill the tank $= \left(1 \div \frac{5x}{6}\right) \times x$

$= 1 \times \frac{6}{5x} \times x$

$= \frac{6}{5}$ hour

$= 1\frac{1}{5}$ hour

----- -----