

**\* Answer The Following Questions In One Sentence.[1 Marks Each]****[6]**

1. Circle the following statements of proportion that are true.

$$4 : 7 :: 12 : 21$$

**Ans. :**  $4 : 7 \rightarrow$  Already in its simplest form.

$$12 : 21 \rightarrow \text{H.C.F} = 3 \rightarrow 12/3 : 21/3 = 4 : 7.$$

Both ratios are equal, so the proportion is true.

2. Circle the following statements of proportion that are true.

$$8 : 3 :: 24 : 6$$

**Ans. :**  $8 : 3 \rightarrow$  Already in its simplest form.

$$24 : 6 \rightarrow \text{H.C.F} = 6 \rightarrow 24/6 : 6/6 = 4 : 1.$$

Since both ratios are not equal, so the proportion is true.

3. Circle the following statements of proportion that are true.

$$7 : 12 :: 12 : 7$$

**Ans. :**  $7 : 12 \rightarrow$  Already in its simplest form.

$$12 : 7 \rightarrow$$
 Already in its simplest form.

Since both ratios are not equal, so the proportion is true.

4. Circle the following statements of proportion that are true.

$$21 : 6 :: 35 : 10$$

**Ans. :**  $21 : 6 \rightarrow \text{H.C.F} = 3 \rightarrow 21/3 : 6/3 = 7 : 2.$

$$35 : 10 \rightarrow \text{H.C.F} = 5 \rightarrow 35/5 : 10/5 = 7 : 2.$$

Since both ratios are equal, so the proportion is true.

5. Circle the following statements of proportion that are true.

$$12 : 18 :: 28 : 12$$

**Ans. :**  $12 : 18 \rightarrow \text{H.C.F} = 6 \rightarrow 12/6 : 18/6 = 2 : 3.$

$$28 : 12 \rightarrow \text{H.C.F} = 4 \rightarrow 28/4 : 12/4 = 7 : 3.$$

Since both ratios are not equal, so the proportion is false.

6. Circle the following statements of proportion that are true.

$$24 : 8 :: 9 : 3$$

**Ans. :**  $24 : 8 \rightarrow \text{H.C.F} = 8 \rightarrow 24/8 : 8/8 = 3 : 1.$

$$9 : 3 \rightarrow \text{H.C.F} = 3 \rightarrow 9/3 : 3/3 = 3 : 1.$$

Since both ratios are equal, so the proportion is true.

**\* Questions With Calculation.[2 Marks Each]****[60]**

7. Give 3 ratios that are proportional to  $4 : 9$ .



**Ans. :** To find ratios proportional to 4 : 9, we multiply both terms by the same number :

$$4 \times 2 : 9 \times 2 = 8 : 18$$

$$4 \times 3 : 9 \times 3 = 12 : 27$$

$$4 \times 5 : 9 \times 5 = 20 : 45$$

So, three ratios proportional to 4 : 9 are 8 : 18; 12 : 27; and 20 : 45.

8. Fill in the missing numbers for these ratios that are proportional to 18 : 24.

$$3 : \underline{\hspace{2cm}} \quad 12 : \underline{\hspace{2cm}} \quad 20 : \underline{\hspace{2cm}} \quad 27 : \underline{\hspace{2cm}}$$

**Ans. :** Simplifying 18 : 24

$$\text{H.C.F} = 6 \rightarrow 18/6 : 24/6 = 3 : 4.$$

So any proportional ratio must equal 3 : 4.

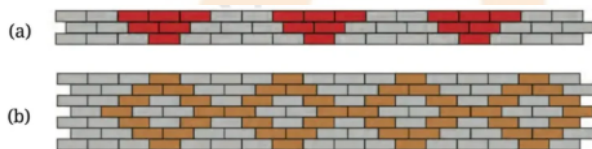
(i)  $3 : \underline{\hspace{2cm}} = 3 : 4$

(ii)  $12 : \underline{\hspace{2cm}} = 3 \times 4 : 4 \times 4 = 12 : 16.$

(iii)  $20 : \underline{\hspace{2cm}} = 3 \times 20/3 : 4 \times 20/3 = 20 : 80/3.$

(iv)  $27 : \underline{\hspace{2cm}} = 3 \times 9 : 4 \times 9 = 27 : 36.$

9. The following figure shows a small portion of a long brick wall with patterns made using coloured bricks. Each wall continues this pattern throughout the wall. What is the ratio of grey bricks to coloured bricks? Try to give the ratios in their simplest form.



**Ans. :** (a) Grey bricks : Coloured bricks = 18 : 11 = 6 : 11.

(b) Grey bricks : Coloured bricks = 48 : 23.

10. A car travels 90 km in 150 minutes. If it continues at the same speed, what distance will it cover in 4 hours?

If it continues at the same speed, the ratio of the time taken should be proportional to the ratio of the distance covered.

$$150 : 90 :: 4 : ?$$

**Ans. :** self

11. Is this the right way to formulate the question ?

No, because 150 is in minutes, but 4 is in hours, The second ratio should use the same units for times as the first ratio. Since 4 hours is 240 minutes, the right form is 150 : 90 :: 240 : ?

**Ans. :** self

12. How can you find the distance covered in 240 minutes?

Discuss with your classmates and find the answer using different strategies.

**Ans. :** self



13. A small farmer in Himachal Pradesh sells each 200 g packet of tea for ₹200. A large estate in Meghalaya sells each 1 kg packet of tea for ₹800. Are the weight-to-price ratios in both places proportional? Which tea is more expensive?

**Ans. :** The ratio of weight to price of the Himachal tea is 200 : 200.

What is the weight to price ratio of the Meghalaya tea ? Is it 1 : 800?

This would not be appropriate, because we considered the weight in grams in the case of Himachal. So, the weight to price ratio is 1000 : 800 in Meghalaya after we convert the weight to grams.

To check if the ratios are proportional, we need to see if both ratios are the same in their simplest forms.

The Himachal tea ratio in its simplest form is 1 : 1.

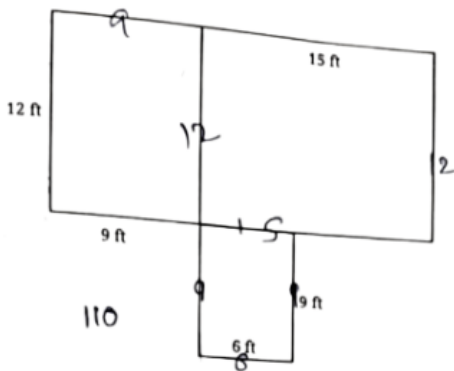
The Meghalaya tea ratio in its simplest form in 5:4.

So, the ratios are not proportional.

14. The Earth travels approximately 940 million kilometres around the Sun in a year. How many kilometres will it travel in a week?

**Ans. :** self

15. A mason is building a house in the shape shown in the diagram. He needs to construct both the outer walls and the inner wall that separates two rooms. To build a wall of 10-feet, he requires approximately 1450 bricks. How many bricks would he need to build the house? Assume all walls are of the same height and thickness.



**Ans. :** self

16. Puneeth's father went from Lucknow to Kanpur in 2 hours by riding his motorcycle at a speed of 50 km/h. If he drives at 75 km/h, how long will it take him to reach Kanpur? Can we form this problem as a proportion -

50 : 2 :: 75 : \_\_\_\_

**Ans. :** self

17. Go to the market and collect the prices of different sizes of shampoo containers of the same shampoo and create a table like the one given below. See if the volume of shampoo is proportional to the price.

Container	Volume	Price
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Sachet	6 mL	₹ 2
Small Bottle	180 mL	₹ 154
Medium Bottle	340 mL	₹ 276
Large Bottle	1000 mL	₹ 540

**Ans. :** self

18. Prashanti and Bhuvan started a food cart business near their school. Prashanti invested ₹ 75,000 and Bhuvan invested ₹ 25,000. At the end of the first month, they gained a profit of ₹4,000. They decided that they would share the profit in the same ratio as that of their investment. What is each person's share of the profit?

**Ans. :** The ratio of their investment is 75000: 25000.

Reducing this ratio to its simplest form, we get 3: 1.

3+1 is 4 and dividing the profit of 4000 by 4, we get 1000.

So, Prashanti's share is  $3 \times 1000$  and Bhuvan's share is  $1 \times 1000$ .

So, Prashanti would get ₹3,000 and Bhuvan would get ₹1,000 of the profit.

19. A mixture of 40 kg contains sand and cement in the ratio of 3: 1. How much cement should be added to the mixture to make the ratio of sand to cement 5: 2?

**Ans. :** Let us find the quantity of sand and cement in the original mixture. The ratio is 3:1 and the total weight is 40 kg.

So, the weight of sand is  $\frac{3}{(3+1)} \times 40 = 30kg$ .

The weight of cement is  $\frac{1}{(3+1)} \times 40 = 10kg$ .

20. Divide ₹4,500 into two parts in the ratio 2: 3.

**Ans. :** self

21. In a science lab, acid and water are mixed in the ratio of 1:5 to make a solution. In a bottle that has 240 mL of the solution, how much acid and water does the solution contain?

**Ans. :** self

22. Blue and yellow paints are mixed in the ratio of 3: 5 to produce green paint. To produce 40 mL of green paint, how much of these two colours are needed? To make the paint a lighter shade of green, I added 20 mL of yellow to the mixture. What is the new ratio of blue and yellow in the paint?

**Ans. :** self

23. To make soft idlis, you need to mix rice and urad dal in the ratio of 2: 1. If you need 6 cups of this mixture to make idlis tomorrow morning, how many cups of rice and urad dal will you need?

**Ans. :** self

24. I have one bucket of orange paint that I made by mixing red and yellow paints in the ratio of 3: 5. I added another bucket of yellow paint to this mixture. What is the ratio of red paint to yellow paint in the new mixture?

**Ans. :** self

25. Anagh mixes 600 mL of orange juice with 900 mL of apple juice to make a fruit drink. Write the ratio of orange juice to apple juice in its simplest form.

**Ans. :** self

26. Last year, we hired 3 buses for the school trip. We had a total of 162 students and teachers who went on that trip and all the buses were full. This year we have 204 students. How many buses will we need? Will all the buses be full?

**Ans. :** self

27. The area of Delhi is 1,484 sq. km and the area of Mumbai is 550 sq. km. The population of Delhi is approximately 30 million and that of Mumbai is 20 million people. Which city is more crowded? Why do you say so?

**Ans. :** self

28. A crane of height 155 cm has its neck and the rest of its body in the ratio 4: 6. For your height, if your neck and the rest of the body also had this ratio, how tall would your neck be?

**Ans. :** self

29. Let us try an ancient problem from Lilavati. At that 4 time weights were measured in a unit named palas 22 and niskas was a unit of money. "If  $2\frac{1}{2}$  palas of saffron costs  $\frac{3}{7}$  niskas, O expert businessman! tell me quickly what quantity of saffron can be bought for 9 niskas?"

**Ans. :** self

30. Harmain is a 1-year-old girl. Her elder brother is 5 years old. What will be Harmain's age when the ratio of her age to her brother's age is 1: 2?

**Ans. :** self

31. The mass of equal volumes of gold and water are in the ratio 37: 2. If 1 litre of water is 1 kg in mass, what is the mass of 1 litre of gold?

**Ans. :** self

32. It is good farming practice to apply 10 tonnes of cow manure for 1 acre of land. A farmer is planning to grow tomatoes in a plot of size 200 ft by 500 ft. How much manure should he buy? (Please refer to the section on Unit Conversions earlier in this chapter).

**Ans. :** self

33. A tap takes 15 seconds to fill a mug of water. The volume of the mug is 500 mL. How much time does the same tap take to fill a bucket of water if the bucket has a 10-litre capacity?

Ans. : self

34. One acre of land costs ₹15,00,000. What is the cost of 2,400 square feet of the same land?

Ans. : self

35. A tractor can plough the same area of a field 4 times faster than a pair of oxen. A farmer wants to plough his 20-acre field. A pair of oxen takes 6 hours to plough an acre of land. How much time would it take if the farmer used a pair of oxen to plough the field? How much time would it take him if he decides to use a tractor instead?

Ans. : self

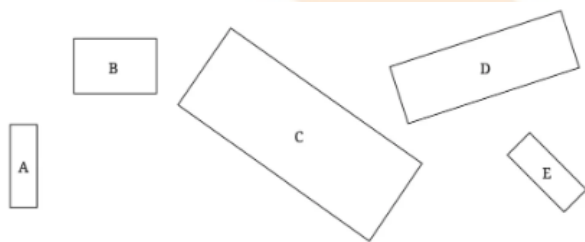
36. The 10 coin is an alloy of copper and nickel called 'cupro-nickel'. Copper and nickel are mixed in a 3:1 ratio to get this alloy. The mass of the coin is 7.74 grams. If the cost of copper is ₹906 per kg and the cost of nickel is ₹1,341 per kg, what is the cost of these metals in a ₹10 coin?

Ans. : self

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

**[3]**

37. Look at the following rectangles. Which rectangles are similar to each other? You can verify this by measuring the width and height using a scale and comparing their ratios.



Ans. :

Rectangle	Width	Height	Ratio
A	0.5 cm	1.5 cm	$0.5 : 1.5 = 1 : 3$
B	1.5 cm	1 cm	$1.5 : 1 = 3 : 2$
C	4.5 cm	2 cm	$4.5 : 2 = 9 : 4$
D	3.5 cm	1 cm	$3.5 : 1 = 7 : 2$
E	0.5 cm	1.5 cm	$0.5 : 1.5 = 1 : 3$

Since rectangles A and E have the same simplified ratio 1 : 3. So, they are similar to each other.

\* Questions With Calculation.[5 Marks Each]

[5]

38. Let us draw some human figures. Measure your friend's body—the lengths of their head, torso, arms, and legs. Write the ratios as mentioned below -



head : torso

\_\_\_\_ : \_\_\_\_

torso : arms

\_\_\_\_ : \_\_\_\_

torso : legs

\_\_\_\_ : \_\_\_\_



**Ans. :** My friend's body measurements :

(i) Head = 22 *cm*

(ii) Torso (neck to hip) = 50 *cm*

(iii) Arms (shoulder to fingertip) = 60 *cm*

(iv) Legs (hip to foot) = 80 *cm*

1. Head : Torso = 22 : 50

Simplify by dividing both by 2 → 11 : 25.

2. Torso : Arms = 50 : 60

Simplify by dividing both by 10 → 5 : 6.

3. Torso : Legs = 50 : 80

Simplify by dividing both by 10 → 5 : 8.

So the ratios are :

- Head : Torso = 11 : 25

- Torso : Arms = 5 : 6

- Torso : Legs = 5 : 8

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Student Bro

