

# MATHEMATICS

## Chapter 8: Comparing Quantities



## Important Questions

### Multiple Choice Questions :

Question 1. Convert 0.09 into per cent.

- (a) 9%
- (b) 8%
- (c) 10%
- (d) None of these

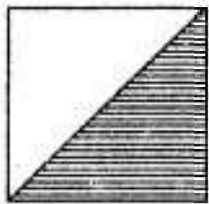
Question 2. Convert 0.2 into per cent.

- (a) 200%
- (b) 2%
- (c) 20%
- (d) None of these

Question 3. If 65% of students in a class have bicycle, what per cent of the students do not have bicycles ?

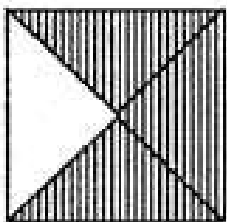
- (a) 35%
- (b) 25%
- (c) 45%
- (d) None of these

Question 4. What per cent of the adjoining figure is shaded ?



- (a) 50%
- (b) 40%
- (c) 100%
- (d) None of these

Question 5. What per cent of the given figure is shaded ?



- (a) 75%
- (b) 50%
- (c) 25%
- (d) None of these

Question 6. A survey of 40 children showed that 25% liked playing football. How many children liked playing football ?

- (a) 10
- (b) 20
- (c) 30
- (d) None of these

Question 7. Find 50% of 164.

- (a) 72
- (b) 62
- (c) 82
- (d) None of these

Question 8. Rahul has saved Rs. 20 when a discount of 25% was given. What was the price of the sweater before the discount ?

- (a) 70
- (b) 60
- (c) 80
- (d) None of these

Question 9. Convert the given fractional numbers 18 into percentage.

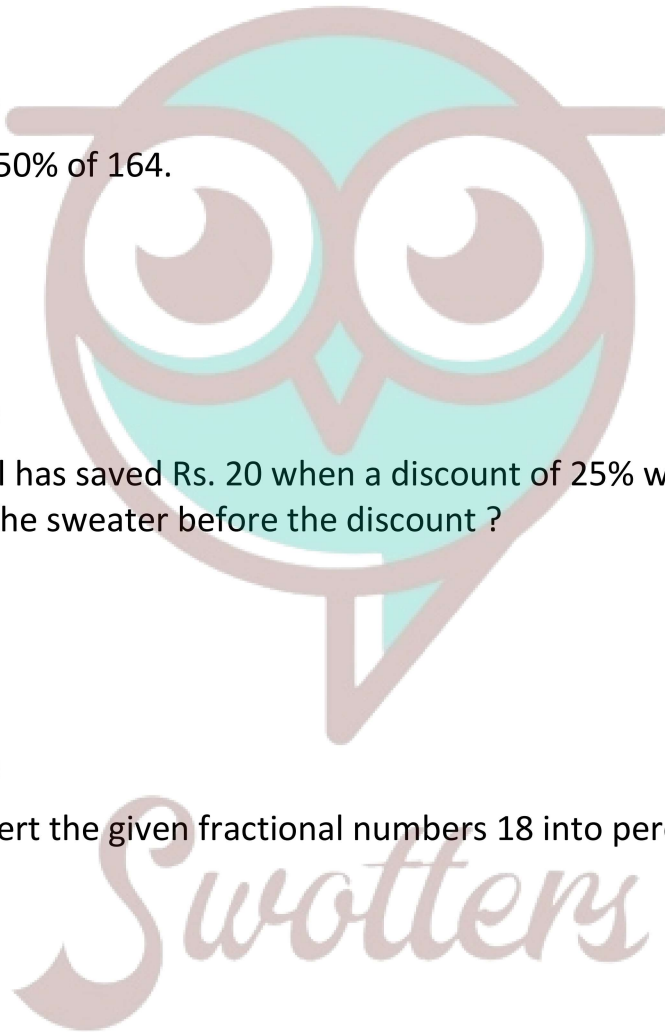
- (a) 12.5%
- (b) 13.5%
- (c) 14.5%
- (d) None of these

Question 10. Convert the given decimal fractions to per cent

- (a) 6.5%
- (b) 0.065%
- (c) 65%
- (d) None of these

Question 11. Find 75% of 1 kg.

- (a) 750 g



- (b) 75 g
- (c) .750 g
- (d) None of these

Question 12. Find the whole quantity if 5% of it is 600.

- (a) 1200
- (b) 120
- (c) 12000
- (d) None of these

Question 13. Gardening shares are bought for Rs. 250 and sold for Rs. 325. What is the profit ?

- (a) Rs. 75
- (b) Rs. 50
- (c) Rs. 25
- (d) None of these

Question 14. Find loss if CP is 250 and SP is Rs. 150.

- (a) Rs. 50
- (b) Rs. 100
- (c) Rs. 15
- (d) None of these

Question 15. Find interest if Principal = Rs. 1200, rate of interest = 12% p.a. and Time 1 year.

- (a) Rs. 144
- (b) Rs. 244
- (c) Rs. 344
- (d) None of these

### Very Short Questions :

1. Find the ratio of:
  - (a) 5 km to 400 m
  - (b) 2 hours to 160 minutes
2. State whether the following ratios are equivalent or not?
  - (a) 2 : 3 and 4 : 5
  - (b) 1 : 3 and 2 : 6

3. Express the following ratios in simplest form:
  - (a)  $6\frac{1}{5} : 2\frac{1}{3}$
  - (b)  $42 : 56$
4. Compare the following ratios:  
 $3 : 4$ ,  $5 : 6$  and  $3 : 8$
5. State whether the following ratios are proportional or not:
  - (i)  $20 : 45$  and  $4 : 9$
  - (ii)  $9 : 27$  and  $33 : 11$
6.  $24$ ,  $36$ ,  $x$  are in continued proportion, find the value of  $x$ .
7. Find the mean proportional between  $9$  and  $16$ .
8. Find:
  - (i)  $36\%$  of  $400$
  - (ii)  $16\frac{2}{3}\%$  of  $32$

### Short Questions :

1. Find a number whose  $6\frac{1}{4}\%$  is  $12$ .
2. What per cent of  $40$  kg is  $440$  g?
3. Convert each of the following into the decimal form:
  - (a)  $25.2\%$
  - (b)  $0.15\%$
  - (c)  $25\%$
4. What per cent of
  - (a)  $64$  is  $148.48$ ?
  - (b)  $75$  is  $1225$ ?
5. A machine costs ₹  $7500$ . Its value decreases by  $5\%$  every year due to usage. What will be its price after one year?
6. What sum of money lent out at  $12$  per cent p.a. simple interest would produce ₹  $9000$  as interest in  $2$  years?

### Long Questions :

1. Rashmi obtains  $480$  marks out of  $600$ . Rajan obtains  $560$  marks out of  $700$ . Whose performance is better?
2. ₹  $9000$  becomes ₹  $18000$  at simple interest in  $8$  years. Find the rate per cent per annum.

3. The cost of an object is increased by 12%. If the current cost is ₹ 896, what was its original cost?
4. Radhika borrowed ₹ 12000 from her friends. Out of which ₹ 4000 were borrowed at 18% and the remaining at 15% rate of interest per annum. What is the total interest after 3 years?
5. Bhavya earns ₹ 50,000 per month and spends 80% of it. Due to pay revision, her monthly income increases by 20% but due to price rise, she has to spend 20% more. Find her new savings.
6. The simple interest on a certain sum at 5% per annum for 3 years and 4 years differ by ₹ 82. Find the sum.
7. Rajan's monthly income is 20% more than the monthly income of Sarita. What per cent of Sarita's income is less than Rajan's monthly income?
8. If 10 apples are bought for ₹ 11 and sold at the rate of 11 apples for ₹ 10. Find the overall gain or loss per cent in these transactions.
9. If 25 men can do a work in 36 hours, find the number of men required to do the same work in 108 hours.
10. A machine is sold by A to B at a profit of 10% and then B sold it to C at a profit of 20%. If C paid ₹ 1200 for the machine, what amount was paid by A to purchase the machine?

### Assertion Reason Questions:

**1) Assertion (A)** –The ratio of 50 paise to Rs. 1 is 1 : 2.

**Reasons (R)** –A ratio can be defined as the relationship or comparison between two numbers of the same unit to check how bigger is one number than the other one

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is not the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

**2) Assertion (A)** –A shopkeeper purchased 2 refrigerators for Rs 9800 and Rs 8200 respectively. He sold them for Rs 16920. Loss% = 6%

**Reasons (R)** –Loss percentage refers to the amount of loss incurred which is expressed or calculated in percentage

- a) Both A and R are true and R is the correct explanation of A
- b) Both A and R are true but R is not the correct explanation of A
- c) A is true but R is false
- d) A is false but R is true

**ANSWER KEY -****Multiple Choice questions :**

1. (a) 9%
2. (c) 20%
3. (a) 35%
4. (a) 50%
5. (a) 75%
6. (a) 10
7. (c) 82
8. (c) 80
9. (a) 12.5%
10. (c) 65%
11. (a) 750 g
12. (c) 12000
13. (a) Rs. 75
14. (b) Rs. 100
15. (a) Rs. 144

**Very Short Answer :**

1. (a)  $5 \text{ km} = 5 \times 1000 = 5000 \text{ m}$   
Ratio of 5 km to 400 m  
 $= 5000 \text{ m} : 400 \text{ m}$   
 $= 25 : 2$   
Required ratio = 25 : 2  
(b)  $2 \text{ hours} = 2 \times 60 = 120 \text{ minutes}$   
Ratio of 2 hours to 160 minutes  
 $= 120 : 160$   
 $= 3 : 4$   
Required ratio = 3 : 4
2. (a) Given ratios = 2 : 3 and 4 : 5

$$\text{or } \frac{2}{3} \text{ and } \frac{4}{5}$$

$$\text{LCM of 3 and 5} = 15$$

$$\therefore \frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$$

$$\text{and } \frac{4}{5} = \frac{4 \times 3}{5 \times 3} = \frac{12}{15}$$

$$\text{Here, } \frac{10}{15} < \frac{12}{15}$$

Hence 2 : 3 and 4 : 5 are not equivalent ratios.

(b) Given ratios = 1 : 3 and 2 : 6

$$\text{LCM of 3 and 6} = 6$$

$$\text{or } \frac{1}{3} \text{ and } \frac{2}{6}$$

$$\text{LCM of 3 and 6} = 6$$

$$\therefore \frac{1}{3} = \frac{1 \times 2}{3 \times 2} = \frac{2}{6}$$

$$\text{and } \frac{2}{6} = \frac{2 \times 1}{6 \times 1} = \frac{2}{6}$$

$$\text{Here, } \frac{2}{6} = \frac{2}{6}$$

Hence, 1 : 3 and 2 : 6 are equivalent ratios.

3.

$$(a) 6\frac{1}{5} : 2\frac{1}{3}$$

$$\Rightarrow \frac{31}{5} : \frac{7}{3} \Rightarrow \frac{31}{5} \div \frac{7}{3}$$

$$\Rightarrow \frac{31}{5} \times \frac{3}{7} = \frac{63}{35} \text{ or } 63 : 35$$

Hence, the required form of the ratio  
= 63 : 35.

$$(b) 42 : 56$$

$$\Rightarrow \frac{42}{56} = \frac{42 \div 14}{56 \div 14} = \frac{3}{4} \text{ or } 3 : 4$$

[HCF of 42 and 56 = 14]

Hence, the required form of ratio = 3 : 4.

4. Given: 3 : 4, 5 : 6 and 3 : 8

$$\text{or } \frac{3}{4}, \frac{5}{6} \text{ and } \frac{3}{8}$$

$$\text{LCM of 4, 6 and 8} = 24$$



$$\therefore \frac{3 \times 6}{4 \times 6} = \frac{18}{24}, \frac{5 \times 4}{6 \times 4} = \frac{20}{24}$$

$$\text{and } \frac{3 \times 3}{8 \times 3} = \frac{9}{24}$$

Here  $9 < 18 < 20$

$$\text{or } \frac{9}{24} < \frac{18}{24} < \frac{20}{24}$$

$$\text{or } \frac{3}{8} < \frac{3}{4} < \frac{5}{6}$$

Hence,  $3 : 8 < 3 : 4 < 5 : 6$

5. (i)  $20 : 45$  and  $4 : 9$

$$\text{Product of extremes} = 20 \times 9 = 180$$

$$\text{Product of means} = 45 \times 4 = 180$$

Here, the product of extremes = Product of means

Hence, the given ratios are in proportion.

- (ii)  $9 : 27$  and  $33 : 11$

$$\text{Product of extremes} = 9 \times 11 = 99$$

$$\text{Product of means} = 27 \times 33 = 891$$

Here, the product of extremes  $\neq$  Product of means

Hence, the given ratios are not in proportion.

6. Since,  $24, 36, x$  are in continued proportion.

$$24 : 36 :: 36 : x$$

$$\Rightarrow 24 \times x = 36 \times 36$$

$$\Rightarrow x = 54$$

Hence, the value of  $x = 54$ .

7. Let  $x$  be the mean proportional between  $9$  and  $16$ .

$$9 : x :: x : 16$$

$$\Rightarrow x \times x = 9 \times 16$$

$$\Rightarrow x^2 = 144$$

$$\Rightarrow x = \sqrt{144} = 12$$

Hence, the required mean proportional =  $12$ .

- 8.

$$(i) 36\% \text{ of } 400 = \frac{36}{100} \times 400 = 36 \times 4 = 144$$

$$(ii) 16\frac{2}{3}\% \text{ of } 32 = \frac{50}{3}\% \text{ of } 32 = \frac{50}{3} \times \frac{1}{100} \times 32 \\ = \frac{16}{3} = 5\frac{1}{3}$$

### Short Answer :

1. Let the required number be  $x$ .

$$6\frac{1}{4}\% \text{ of } x = 12$$

$$\frac{25}{4}\% \text{ of } x = 12$$

$$\Rightarrow \frac{25}{4 \times 100} \times x = 12$$

$$\Rightarrow x = \frac{12 \times 4 \times 100}{25} = 192$$

Hence, the required number = 192.

2. Let  $x\%$  of 40 kg = 440 g

$$\Rightarrow \frac{x}{100} \times 40 \times 1000 = 440$$

$$\Rightarrow 400x = 440$$

$$\therefore x = \frac{440}{400} = 1.1\%$$

Hence, the required Percentage = 1.1%

- 3.

$$(a) 25.2\% = \frac{25.2}{100} = 0.252$$

$$(b) 0.15\% = \frac{0.15}{100} = 0.0015$$

$$(c) 25\% = \frac{25}{100} = 0.25$$

- 4.

(a) Let  $x\%$  of 64 = 148.48

$$\therefore \frac{x}{100} \times 64 = 148.48$$

$$\therefore x = \frac{148.48 \times 100}{64} = 232\%$$

Hence, the required Percentage = 232%

(b) Let  $x\%$  of 75 = 1225

$$\frac{x}{100} \times 75 = 1225$$

$$\Rightarrow x = \frac{1225 \times 100}{75} = 1633.3\%$$

Hence, the required Percentage = 1633.3%

5. The cost price of the machine = ₹ 7500

Decrease in price = 5%

Decreased price after one year

$$= 7500 \left( 1 - \frac{5}{100} \right) = 7500 \times \frac{95}{100}$$

$$= 75 \times 95$$

$$= ₹ 7125$$

Hence, the required price = ₹ 7125.

6. Here, Interest = ₹ 9000

Rate = 12% p.a.

Time = 2 years

Principal = ?

$$\begin{aligned} \text{Principal} &= \frac{100 \times I}{R \times T} \\ &= \frac{100 \times 9000}{12 \times 2} = ₹ 37500 \end{aligned}$$

Hence, the required principal amount = ₹ 37500.

### Long Answer :

1. Rashmi obtains 480 marks out of 600

$$\text{Marks Percentage} = \frac{480}{600} \times 100 = 80\%$$

Rajan obtains 560 marks out of 700

$$\text{Marks Percentage} = \frac{560}{700} \times 100 = 80\%$$

Since, both of them obtained the same per cent of marks i.e. 80%.

So, their performance cannot be compared.

2. Here, Principal = ₹ 9000

Amount = ₹ 18000

Interest = Amount – Principal = ₹ 18000 – ₹ 9000 = ₹ 9000

$$R = \frac{100 \times I}{P \times T} = \frac{100 \times 9000}{9000 \times 8}$$

$$= \frac{25}{2}\% \text{ or } 12\frac{1}{2}\%$$

Hence, the required rate of interest =  $12\frac{1}{2}\%$ .

3. Here, rate of increase in cost = 12%

Increased Cost = ₹ 896

Original Cost = ?

Let the Original Cost be ₹ x

$$\therefore \text{Increase in cost} = 12\% \text{ of } x = \frac{12}{100}x$$

$$\text{Increased cost of the object} = x + \frac{12}{100}x$$

$$= \frac{112}{100}x$$

$$\therefore \frac{112}{100}x = 896$$

$$\Rightarrow x = \frac{896 \times 100}{112} = ₹ 800$$

Hence, the required cost = ₹ 800.

4. Total amount borrowed by Radhika = ₹ 12,000

The amount borrowed by her at 18% p.a. = ₹ 4000

$$\therefore \text{Interest} = \frac{P \times R \times T}{100} = \frac{4,000 \times 18 \times 3}{100}$$

$$= ₹ 2160$$

Remaining amount

$$= ₹ 12,000 - ₹ 4,000 = ₹ 8,000$$

$$\text{Interest on ₹ 8000} = \frac{P \times R \times T}{100} = \frac{8,000 \times 15 \times 3}{100}$$

$$= ₹ 3600$$

Total interest = ₹ 2160 + ₹ 3600 = ₹ 5760

Hence, the total interest = ₹ 5760.

5. Monthly income of Bhavya = ₹ 50,000

Money spent by her = 80% of ₹ 50,000

$$= \frac{80}{100} \times 50,000 = ₹ 40,000$$

Due to pay revision, income is increased by 20%

$$\text{i.e. } 50,000 \left(1 + \frac{20}{100}\right) = 50,000 \times \frac{120}{100} = ₹ 60,000$$

Money spent due to price rise

$$\begin{aligned} &= ₹ 40,000 \left(1 + \frac{20}{100}\right) = ₹ 40,000 \times \frac{120}{100} \\ &= ₹ 48,000 \end{aligned}$$

So, the new savings = ₹ 60,000 – ₹ 48,000 = ₹ 12,000

6. Let the required sum be ₹ P.

Simple interest for 3 years

$$= \frac{P \times R \times T}{100} = \frac{P \times 5 \times 3}{100} = ₹ \frac{3P}{20}$$

$$\text{Simple interest for 4 years} = \frac{P \times R \times T}{100}$$

$$= \frac{P \times 5 \times 4}{100} = ₹ \frac{4P}{20}$$

As per the question, we have

$$\frac{4P}{20} - \frac{3P}{20} = 82 \Rightarrow \frac{P}{20} = 82$$

$$\Rightarrow P = 20 \times 82 = ₹ 1640$$

Hence, the required sum = ₹ 1640

Alternate Method

Simple Interest gained from 3rd to 4th year = ₹ 82

Time (4th year – 3rd year) = 1 year

$$P = \frac{SI \times 100}{R \times T}$$

$$P = \frac{82 \times 100}{5 \times 1} = 1640$$

Required sum = ₹ 1640

7. Let the monthly income of Sarita be ₹ 100.

Rajan's monthly income

$$= ₹ \left[100 \left(1 + \frac{20}{100}\right)\right] = ₹ \frac{100 \times 120}{100} = ₹ 120$$

Now, Sarita's monthly income is less than the monthly income of Rajan by = ₹

$$120 - ₹ 100 = ₹ 20$$

Per cent of less in Rajan's monthly income

$$= \frac{20 \times 100}{120} = \frac{50}{3}\% = 16\frac{2}{3}\%$$

Hence, the required per cent =  $16\frac{2}{3}\%$

8. CP of 10 apples = ₹ 11

$$\text{CP of 1 apple} = ₹ \frac{11}{10}$$

SP of 11 apples = ₹ 10

$$\text{SP of 1 apple} = ₹ \frac{10}{11}$$

Clearly  $\text{CP} > \text{SP}$  ( $\because \frac{11}{10} > \frac{10}{11}$ )

$$\begin{aligned} \therefore \text{Loss} &= ₹ \left( \frac{11}{10} - \frac{10}{11} \right) \\ &= ₹ \left( \frac{121 - 100}{110} \right) = ₹ \frac{21}{110} \end{aligned}$$

$$\text{On ₹ } \frac{11}{10}, \text{ the loss} = ₹ \frac{21}{110}$$

$$\text{On ₹ 1, the loss} = ₹ \frac{21}{110} \times \frac{10}{11}$$

$$\text{On ₹ 100, the loss} = ₹ \frac{21}{110} \times \frac{10}{11} \times 100$$

$$= \frac{2100}{121}\% = 17\frac{43}{121}\%$$

Hence, the overall loss =  $17\frac{43}{121}\%$ .

9. Let the number of men required to be x.

Men : Hours :: Men : Hours

$$25 : 36 :: x : 108$$

Product of extremes =  $25 \times 108$

Product of means =  $36 \times x$

Product of means = Product of extremes

$$36 \times x = 25 \times 108$$

$$\Rightarrow x = 25 \times 3 = 75$$

Hence, the required number of men = 75.

10. Cost price of machine for C = Selling price of the machine for B = ₹ 1200

$$\therefore SP = CP \left( 1 + \frac{P}{100} \right)$$

$$1200 = CP \left( 1 + \frac{20}{100} \right)$$

$$\Rightarrow 1200 = CP \times \frac{120}{100}$$

$$\therefore CP = \frac{1200 \times 100}{120} = ₹ 1000$$

CP of machine for B = SP of machine for A  
= ₹ 1000

$$SP = CP \left( 1 + \frac{P}{100} \right)$$

$$1000 = CP \left( 1 + \frac{10}{100} \right)$$

$$\Rightarrow 1000 = CP \times \frac{110}{100}$$

$$\therefore CP = \frac{1000 \times 100}{110} = ₹ \frac{10000}{11}$$

$$= ₹ 909 \frac{10}{11}$$

Hence, the required cost price = ₹  $909 \frac{10}{11}$  or ₹ 909.09 (approx)

### Assertion Reason answers:

- 1) a) Both A and R are true and R is the correct explanation of A
- 2) a) Both A and R are true and R is the correct explanation of A

Swotters