

# Arithmetic (Level 1)

## Question Paper, Set 08

Time: 1 hour 30 minutes

Maximum marks: 50

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

1. Answer all 20 questions. The marks for each question are shown in brackets.
2. Show your working for the 2, 3 and 5 mark questions.
3. The key sheet and worked solutions are at the end of this paper.

1. Express  $84 : 60$  in its simplest form. [1 mark]
2. Divide ₹5280 into three shares in the ratio  $2 : 5 : 4$ . [3 marks]
3. The first, second and fourth terms of a proportion are 6, 21 and 28 respectively. Find the third term. [1 mark]
4. Find the mean proportional between 5 and 45. [1 mark]
5. If  $\frac{p}{q} = \frac{11}{6}$ , find  $\frac{p-q}{q}$ . [2 marks]
6. The cost of 3 dozen bananas is ₹90. How many bananas can be bought for ₹35? [2 marks]
7.  $x$  varies inversely as  $y$ , and  $x = 12$  when  $y = 15$ . Find (i) the constant of variation, (ii)  $x$  when  $y = 20$ , (iii)  $y$  when  $x = 30$ . [5 marks]
8. Express 17.5% as a fraction in its simplest form. [1 mark]
9. Express 18 as a percentage of 72. [1 mark]
10. The price of a phone falls from ₹1500 to ₹1320. Find the percentage decrease. [2 marks]
11. The population of a town 2 years ago was 50,000. Due to migration, it decreased every year at the rate of 6% per annum. Find its present population. [3 marks]
12. The profit made by selling an article for ₹565 is the same as the loss made by selling it for ₹435. Find the cost price of the article. [2 marks]
13. The marked price of a cycle is ₹1800, which is 20% above its cost price. It is sold at a discount of 10%. Find the cost price, the selling price and the profit percentage. [5 marks]
14. If the cost price of 27 articles is equal to the selling price of 30 articles, find the gain or loss percent. [3 marks]
15. Find the average of the first seven odd numbers. [1 mark]
16. A gun is fired 2.04 km away from Ajay. He hears the sound 6 seconds later. Find the speed of sound in m/s. [2 marks]

17. A cyclist takes 6 hours to cover a distance at 15 km/h. How long will he take to cover the same distance at 20 km/h? [2 marks]
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18. A man crosses a 900 m long bridge in 6 minutes. Find his speed in km/h. [3 marks]
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19. Find the simple interest and the amount on ₹480 at  $6\frac{1}{4}\%$  per annum for  $3\frac{1}{2}$  years. [5 marks]
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20. Mohan opened a shop with an investment of ₹50,000. In the first year he had a loss of 4%, in the second year a profit of 15% and in the third year a profit of 10%. Find his net profit for the three years. [5 marks]
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## Key sheet

| Q  | Answer                          |
|----|---------------------------------|
| 1  | 7 : 5                           |
| 2  | ₹960, ₹2400, ₹1920              |
| 3  | 8                               |
| 4  | 15                              |
| 5  | $\frac{5}{6}$                   |
| 6  | 14 bananas                      |
| 7  | (i) 180 (ii) 9 (iii) 6          |
| 8  | $\frac{7}{40}$                  |
| 9  | 25%                             |
| 10 | 12%                             |
| 11 | 44,180                          |
| 12 | ₹500                            |
| 13 | C.P ₹1500; S.P ₹1620; profit 8% |
| 14 | Loss of 10%                     |
| 15 | 7                               |
| 16 | 340 m/s                         |
| 17 | 4.5 hours                       |
| 18 | 9 km/h                          |
| 19 | S.I ₹105; amount ₹585           |
| 20 | ₹10,720                         |

## Solutions

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1. Express 84 : 60 in its simplest form. [1]

H.C.F of 84 and 60 is 12.

$$\frac{84}{60} = \frac{12 \times 7}{12 \times 5} = \frac{7}{5}$$

Simplest form = 7 : 5

**Ans: 7 : 5**

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2. Divide ₹5280 into three shares in the ratio 2 : 5 : 4. [3]

Sum of the terms of the ratio = 2 + 5 + 4 = 11

$$\text{1st share} = \frac{2}{11} \times 5280 = 960$$

$$\text{2nd share} = \frac{5}{11} \times 5280 = 2400$$

$$\text{3rd share} = \frac{4}{11} \times 5280 = 1920$$

**Ans: ₹960, ₹2400, ₹1920**

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3. The first, second and fourth terms of a proportion are 6, 21 and 28 respectively. Find the third term. [1]

$$6 : 21 = x : 28$$

$$\frac{6}{21} = \frac{x}{28}$$

$$x = \frac{6 \times 28}{21} = 8$$

**Ans: 8**

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4. Find the mean proportional between 5 and 45. [1]

$$\text{Mean proportional} = \sqrt{5 \times 45} = \sqrt{225} = 15$$

**Ans: 15**

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5. If  $\frac{p}{q} = \frac{11}{6}$ , find  $\frac{p-q}{q}$ . [2]

By dividendo, if  $\frac{a}{b} = \frac{c}{d}$  then  $\frac{a-b}{b} = \frac{c-d}{d}$ .

$$\frac{p-q}{q} = \frac{11-6}{6} = \frac{5}{6}$$

**Ans:  $\frac{5}{6}$**

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6. The cost of 3 dozen bananas is ₹90. How many bananas can be bought for ₹35? [2]

Cost (₹) | Bananas

$$90 \mid 36$$

$$35 \mid y$$

Direct proportion:  $x_1 y_2 = x_2 y_1$

$$90 \times y = 35 \times 36 \Rightarrow y = \frac{35 \times 36}{90} = 14$$

**Ans: 14 bananas**

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7.  $x$  varies inversely as  $y$ , and  $x = 12$  when  $y = 15$ . Find (i) the constant of variation, (ii)  $x$  when  $y = 20$ , (iii)  $y$  when  $x = 30$ . [5]

$$x \propto \frac{1}{y} \Rightarrow x = \frac{k}{y} \Rightarrow xy = k$$

$$(i) k = 12 \times 15 = 180$$

$$(ii) x = \frac{k}{y} = \frac{180}{20} = 9$$

$$(iii) y = \frac{k}{x} = \frac{180}{30} = 6$$

Ans: (i) 180 (ii) 9 (iii) 6

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8. Express 17.5% as a fraction in its simplest form. [1]

$$17.5\% = \frac{17.5}{100} = \frac{175}{1000} = \frac{7}{40}$$

Ans:  $\frac{7}{40}$

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9. Express 18 as a percentage of 72. [1]

$$\left(\frac{18}{72} \times 100\right)\% = 25\%$$

Ans: 25%

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10. The price of a phone falls from ₹1500 to ₹1320. Find the percentage decrease. [2]

$$\text{Decrease} = 1500 - 1320 = 180$$

$$\% \text{ of decrease} = \left(\frac{180}{1500} \times 100\right)\% = 12\%$$

Ans: 12%

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11. The population of a town 2 years ago was 50,000. Due to migration, it decreased every year at the rate of 6% per annum. Find its present population. [3]

$$A = P \left(1 - \frac{R}{100}\right)^n \text{ with } P = 50,000, R = 6, n = 2$$
$$= 50,000 \left(1 - \frac{6}{100}\right)^2 = 50,000 \times \left(\frac{47}{50}\right)^2 = 44,180$$

Ans: 44,180

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12. The profit made by selling an article for ₹565 is the same as the loss made by selling it for ₹435. Find the cost price of the article. [2]

Let the C.P be ₹ $x$ .

$$\text{Profit} = 565 - x, \quad \text{Loss} = x - 435$$

$$565 - x = x - 435 \Rightarrow 1000 = 2x \Rightarrow x = 500$$

Ans: ₹500

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13. The marked price of a cycle is ₹1800, which is 20% above its cost price. It is sold at a discount of 10%. Find the cost price, the selling price and the profit percentage. [5]

$$\text{C.P} = \frac{100}{100+20} \times 1800 = 1500$$

$$\text{S.P} = \frac{100-10}{100} \times 1800 = 1620$$

$$\text{Profit} = 1620 - 1500 = 120$$

$$\text{Profit \%} = \left(\frac{120}{1500} \times 100\right)\% = 8\%$$

Ans: C.P ₹1500; S.P ₹1620; profit 8%

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14. If the cost price of 27 articles is equal to the selling price of 30 articles, find the gain or loss percent. [3]

Let C.P of each =  $x$  and S.P of each =  $y$ .

$$27x = 30y \Rightarrow \frac{y}{x} = \frac{27}{30} = \frac{9}{10}$$

$y < x$ , so there is a loss.

$$\text{Loss \%} = \left(1 - \frac{y}{x}\right) \times 100 = 10\%$$

**Ans: Loss of 10%**

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15. Find the average of the first seven odd numbers. [1]

The numbers are 1, 3, 5, 7, 9, 11, 13.

$$\begin{aligned}\text{Average} &= \frac{\text{Sum of observations}}{\text{No. of observations}} \\ &= \frac{1+3+5+7+9+11+13}{7} = \frac{49}{7} = 7\end{aligned}$$

**Ans: 7**

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16. A gun is fired 2.04 km away from Ajay. He hears the sound 6 seconds later. Find the speed of sound in m/s. [2]

$$\begin{aligned}S &= \frac{D}{T} = \frac{2.04 \text{ km}}{6 \text{ s}} = \frac{2.04 \times 1000}{6} \text{ m/s} \\ &= 340 \text{ m/s}\end{aligned}$$

**Ans: 340 m/s**

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17. A cyclist takes 6 hours to cover a distance at 15 km/h. How long will he take to cover the same distance at 20 km/h? [2]

$$\begin{aligned}s_1 : s_2 &= T_2 : T_1 \\ 15 : 20 &= T_2 : 6 \Rightarrow T_2 = \frac{15 \times 6}{20} = 4.5 \text{ hours}\end{aligned}$$

**Ans: 4.5 hours**

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18. A man crosses a 900 m long bridge in 6 minutes. Find his speed in km/h. [3]

$$\begin{aligned}S &= \frac{D}{T} = \frac{900 \text{ m}}{6 \times 60 \text{ s}} = 2.5 \text{ m/s} \\ &= 2.5 \times \frac{18}{5} = 9 \text{ km/h}\end{aligned}$$

**Ans: 9 km/h**

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19. Find the simple interest and the amount on ₹480 at  $6\frac{1}{4}\%$  per annum for  $3\frac{1}{2}$  years. [5]

$$R = 6\frac{1}{4}\% = \frac{25}{4}\%, T = 3\frac{1}{2} = \frac{7}{2} \text{ years}$$

$$\begin{aligned}\text{S.I} &= \frac{P \times T \times R}{100} = \frac{480 \times \frac{7}{2} \times \frac{25}{4}}{100} \\ &= 105\end{aligned}$$

$$\text{Amount} = P + \text{S.I} = 480 + 105 = 585$$

**Ans: S.I ₹105; amount ₹585**

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**20.** Mohan opened a shop with an investment of ₹50,000. In the first year he had a loss of 4%, in the second year a profit of 15% and in the third year a profit of 10%. Find his net profit for the three years.  
[5]

$$\begin{aligned}A &= P \left(1 + \frac{R_1}{100}\right) \left(1 + \frac{R_2}{100}\right) \left(1 + \frac{R_3}{100}\right) \\&= 50,000 \left(1 - \frac{4}{100}\right) \left(1 + \frac{15}{100}\right) \left(1 + \frac{10}{100}\right) \\&= 50,000 \times \frac{24}{25} \times \frac{23}{20} \times \frac{11}{10} \\&= 60,720\end{aligned}$$

$$\text{Net profit} = 60,720 - 50,000 = 10,720$$

**Ans: ₹10,720**

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