

Arithmetic (Level 1)

Question Paper, Set 06

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. Find the ratio of 40 minutes to 2 hours in its simplest form. [1 mark]
2. Divide ₹7200 among Ram, Shyam and Mohan in the ratio 3 : 4 : 5. [3 marks]
3. Find x if $x : 12 :: 15 : 36$. [1 mark]
4. Find the mean proportional between 25 and 36. [1 mark]
5. If $\frac{a+b}{a-b} = \frac{9}{5}$, find $a : b$. [2 marks]
6. The cost of 6 m of a particular cloth is ₹348. What is the cost of 4 m of the same cloth? [2 marks]
7. A town with a population of 2400 has provisions for 40 days. After 10 days, 600 more people arrive. How long will the remaining food last at the same rate? [5 marks]
8. Express $\frac{9}{25}$ as a percentage. [1 mark]
9. Find 12% of 450. [1 mark]
10. The price of a bag rises from ₹640 to ₹736. Find the percentage increase. [2 marks]
11. The population of a town is 64,000. It is increasing at the rate of 5% per annum. Find its population after 3 years. [3 marks]
12. A shopkeeper buys an article for ₹1250 and sells it for ₹1100. Find his loss percentage. [2 marks]
13. A trader marks a cooler at ₹2400. He allows a discount of 15% and still gains 20%. Find the discount, the selling price, the cost price and the profit. [5 marks]
14. I bought 12 pens for ₹100 and sold 10 pens for ₹100. Find my profit percentage. [3 marks]
15. The average of 15 numbers is 42. Find their sum. [1 mark]
16. A train starts at 9.40 am at a speed of 72 km/h. At what time will it cover a distance of 150 km? [2 marks]
17. The speeds of two cars are in the ratio 5 : 7. The first car takes 14 hours for a journey. How long will the second car take for the same journey? [2 marks]

- 18.** A train 180 m long running at 72 km/h crosses a bridge in 25 seconds. Find the length of the bridge. [3 marks]
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- 19.** A sum at simple interest of $4\frac{1}{2}\%$ per annum amounts to ₹1298 after 4 years. Find the sum. [5 marks]
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- 20.** Find the amount and the compound interest on ₹40,000 at 8% per annum for 6 months, compounded quarterly. [5 marks]
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Key sheet

Q	Answer
1	1 : 3
2	₹1800, ₹2400, ₹3000
3	$x = 5$
4	30
5	7 : 2
6	232 rupees
7	24 days
8	36%
9	54
10	15%
11	74,088
12	12% loss
13	Discount ₹360; S.P ₹2040; C.P ₹1700; profit ₹340
14	20%
15	630
16	11.45 am
17	10 hours
18	320 m
19	₹1100
20	Amount ₹41,616; C.I ₹1616

Solutions

1. Find the ratio of 40 minutes to 2 hours in its simplest form. [1]

$$2 \text{ hours} = 2 \times 60 \text{ minutes} = 120 \text{ minutes}$$

$$\frac{40 \text{ min}}{120 \text{ min}} = \frac{40}{120} = \frac{1}{3}$$

$$\text{Ratio} = 1 : 3$$

Ans: 1 : 3

2. Divide ₹7200 among Ram, Shyam and Mohan in the ratio 3 : 4 : 5. [3]

$$\text{Sum of the terms of the ratio} = 3 + 4 + 5 = 12$$

$$\text{1st share} = \frac{3}{12} \times 7200 = 1800$$

$$\text{2nd share} = \frac{4}{12} \times 7200 = 2400$$

$$\text{3rd share} = \frac{5}{12} \times 7200 = 3000$$

Ans: ₹1800, ₹2400, ₹3000

3. Find x if $x : 12 :: 15 : 36$. [1]

Product of means = product of extremes.

$$36 \times x = 12 \times 15$$

$$x = \frac{12 \times 15}{36} = 5$$

Ans: $x = 5$

4. Find the mean proportional between 25 and 36. [1]

$$\text{Mean proportional} = \sqrt{25 \times 36} = \sqrt{900} = 30$$

Ans: 30

5. If $\frac{a+b}{a-b} = \frac{9}{5}$, find $a : b$. [2]

Apply componendo and dividendo to $\frac{a+b}{a-b} = \frac{9}{5}$:

$$\frac{(a+b)+(a-b)}{(a+b)-(a-b)} = \frac{9+5}{9-5}$$

$$\Rightarrow \frac{2a}{2b} = \frac{14}{4} \Rightarrow \frac{a}{b} = \frac{7}{2}$$

$$a : b = 7 : 2$$

Ans: 7 : 2

6. The cost of 6 m of a particular cloth is ₹348. What is the cost of 4 m of the same cloth? [2]

Length (m) | Cost (₹)

$$6 \mid 348$$

$$4 \mid y$$

Direct proportion: $x_1 y_2 = x_2 y_1$

$$6 \times y = 4 \times 348 \Rightarrow y = \frac{4 \times 348}{6} = 232$$

Ans: 232 rupees

7. A town with a population of 2400 has provisions for 40 days. After 10 days, 600 more people arrive. How long will the remaining food last at the same rate? [5]

Food left after 10 days is enough for 2400 people for $40 - 10 = 30$ days.

Now there are $2400 + 600 = 3000$ people.

People and days are in inverse proportion: $x_1y_1 = x_2y_2$

$$2400 \times 30 = 3000 \times y$$

$$y = \frac{72,000}{3000} = 24 \text{ days}$$

Ans: 24 days

8. Express $\frac{9}{25}$ as a percentage. [1]

$$\frac{9}{25} = \left(\frac{9}{25} \times 100\right) \% = 36\%$$

Ans: 36%

9. Find 12% of 450. [1]

$$12\% \text{ of } 450 = \frac{12}{100} \times 450 = 54$$

Ans: 54

10. The price of a bag rises from ₹640 to ₹736. Find the percentage increase. [2]

$$\text{Increase} = 736 - 640 = 96$$

$$\% \text{ of increase} = \left(\frac{96}{640} \times 100\right) \% = 15\%$$

Ans: 15%

11. The population of a town is 64,000. It is increasing at the rate of 5% per annum. Find its population after 3 years. [3]

$$\text{Population after } n \text{ years} = P \left(1 + \frac{R}{100}\right)^n$$

$$= 64,000 \left(1 + \frac{5}{100}\right)^3 = 64,000 \times \left(\frac{21}{20}\right)^3$$

$$= 74,088$$

Ans: 74,088

12. A shopkeeper buys an article for ₹1250 and sells it for ₹1100. Find his loss percentage. [2]

Here S.P < C.P, so there is a loss.

$$\text{Loss} = 1250 - 1100 = 150$$

$$\text{Loss \%} = \left(\frac{150}{1250} \times 100\right) \% = 12\%$$

Ans: 12% loss

13. A trader marks a cooler at ₹2400. He allows a discount of 15% and still gains 20%. Find the discount, the selling price, the cost price and the profit. [5]

$$\text{Discount} = 15\% \text{ of } 2400 = 360$$

$$\text{S.P} = 2400 - 360 = 2040$$

$$\text{C.P} = \frac{100}{100 + \text{Profit}\%} \times \text{S.P}$$

$$= \frac{100}{120} \times 2040 = 1700$$

$$\text{Profit} = 2040 - 1700 = 340$$

Ans: Discount ₹360; S.P ₹2040; C.P ₹1700; profit ₹340

14. I bought 12 pens for ₹100 and sold 10 pens for ₹100. Find my profit percentage. [3]

$$\text{C.P of one} = \frac{100}{12}, \quad \text{S.P of one} = \frac{100}{10}$$

$$\text{Profit \%} = \frac{10 - \frac{25}{3}}{\frac{25}{3}} \times 100$$

$$= \frac{\frac{5}{3}}{\frac{25}{3}} \times 100 = 20\%$$

Ans: 20%

15. The average of 15 numbers is 42. Find their sum. [1]

$$x_1 + x_2 + \dots + x_n = n\bar{x}$$

$$\text{Sum} = 15 \times 42 = 630$$

Ans: 630

16. A train starts at 9.40 am at a speed of 72 km/h. At what time will it cover a distance of 150 km? [2]

$$T = \frac{D}{S} = \frac{150}{72} = \frac{25}{12} \text{ h}$$

$$= 2 \text{ h } 5 \text{ min}$$

$$9.40 + 2 \text{ h } 5 \text{ min} = 11.45 \text{ am}$$

Ans: 11.45 am

17. The speeds of two cars are in the ratio 5 : 7. The first car takes 14 hours for a journey. How long will the second car take for the same journey? [2]

$$s_1 : s_2 = T_2 : T_1$$

$$5 : 7 = T_2 : 14 \Rightarrow T_2 = \frac{5 \times 14}{7} = 10 \text{ hours}$$

Ans: 10 hours

18. A train 180 m long running at 72 km/h crosses a bridge in 25 seconds. Find the length of the bridge. [3]

$$\text{Speed} = 72 \times \frac{5}{18} = 20 \text{ m/s}$$

$$\text{Distance in 25 s} = 20 \times 25 = 500 \text{ m}$$

This distance = length of train + length of bridge.

$$\text{Bridge} = 500 - 180 = 320 \text{ m}$$

Ans: 320 m

19. A sum at simple interest of $4\frac{1}{2}\%$ per annum amounts to ₹1298 after 4 years. Find the sum. [5]

$$\text{Amount} = P + \frac{P \times T \times R}{100} = P \left(1 + \frac{T \times R}{100} \right)$$

$$1298 = P \left(1 + \frac{4 \times \frac{9}{2}}{100} \right) = P \left(\frac{59}{50} \right)$$

$$P = 1298 \times \frac{50}{59} = 1100$$

Ans: ₹1100

20. Find the amount and the compound interest on ₹40,000 at 8% per annum for 6 months, compounded quarterly. [5]

$$A = P \left(1 + \frac{R}{100k}\right)^{nk}, \text{ with } k = 4 \text{ (quarterly)}$$

$$= 40,000 \left(1 + \frac{8}{100 \times 4}\right)^{\frac{1}{2} \times 4} = 40,000 \times \left(\frac{51}{50}\right)^2$$

$$= 41,616$$

$$\text{C.I} = 41,616 - 40,000 = 1616$$

Ans: Amount ₹41,616; C.I ₹1616
