

Arithmetic (Level 1)

Question Paper, Set 03

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 750 g to 2 kg in its simplest form. [1 mark]
2. Divide ₹1350 between Anil and Sunil in the ratio 4 : 5. [2 marks]
3. Three numbers are in the ratio 2 : 3 : 4 and the sum of their squares is 725. Find the numbers and their sum. [5 marks]
4. The first, second and fourth terms of a proportion are 8, 20 and 45 respectively. Find the third term. [1 mark]
5. Find the third proportional to 9 and 15. [2 marks]
6. If 15 pens cost ₹210, find the cost of one pen. [1 mark]
7. A man working 6 hours a day takes 10 days to complete a job. How many hours a day must he work to complete it in 12 days? [3 marks]
8. Express the ratio 3 : 5 as a percentage. [1 mark]
9. If 45% of a number is 21 less than 60% of that number, find the number. [2 marks]
10. The price of a scooter rose from ₹56,000 to ₹63,000. Find the increase in price and the percentage increase. [3 marks]
11. The price of petrol rises by 10%. By how much percent must a family reduce its consumption so as not to increase its expenditure? [2 marks]
12. A dealer buys 150 quintals of rice at ₹2400 a quintal. He spends ₹15,000 on transport and storage. He sells the rice at ₹27 per kg. Find his profit or loss, and its percentage. (1 quintal = 100 kg) [5 marks]
13. The cost price of an article is ₹540 and the percent markup is 25%. What is the marked price? [3 marks]
14. A shopkeeper says he sells rice at cost price, but he gives only 960 g for every kg. Find his gain percent. [2 marks]
15. The average of 12 numbers is 18.5. Find their sum. [1 mark]

- 16.** The average age of a family of 5 members is 24 years. If the age of the youngest member is 8 years, what was the average age of the family at the birth of the youngest member? [5 marks]
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- 17.** Convert 25 m/s into km/h. [1 mark]
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- 18.** Udai travels half of his journey by train at 90 km/h and the rest by car at 60 km/h. Find his average speed. [3 marks]
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- 19.** Find the amount on ₹1500 at 8% per annum simple interest for $2\frac{1}{2}$ years. [2 marks]
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- 20.** Find the amount and the compound interest on ₹15,625 for 3 years at 4% per annum, compounded annually. [5 marks]
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Key sheet

Q	Answer
1	3 : 8
2	₹600 and ₹750
3	10, 15, 20; sum = 45
4	18
5	25
6	₹14
7	5 hours
8	60%
9	140
10	Increase ₹7000; 12.5%
11	$9\frac{1}{11}\%$
12	Profit ₹30,000; 8%
13	₹675
14	$4\frac{1}{6}\%$
15	222
16	20 years
17	90 km/h
18	72 km/h
19	₹1800
20	Amount ₹17,576; C.I ₹1951

Solutions

1. Find the ratio of 750 g to 2 kg in its simplest form. [1]

$$2 \text{ kg} = 2 \times 1000 \text{ g} = 2000 \text{ g}$$

$$\frac{750 \text{ g}}{2000 \text{ g}} = \frac{750}{2000} = \frac{3}{8}$$

$$\text{Ratio} = 3 : 8$$

Ans: 3 : 8

2. Divide ₹1350 between Anil and Sunil in the ratio 4 : 5. [2]

$$\text{Sum of the terms of the ratio} = 4 + 5 = 9$$

$$\text{First part} = \frac{4}{9} \times 1350 = 600$$

$$\text{Second part} = \frac{5}{9} \times 1350 = 750$$

Ans: ₹600 and ₹750

3. Three numbers are in the ratio 2 : 3 : 4 and the sum of their squares is 725. Find the numbers and their sum. [5]

Let the numbers be $2k, 3k, 4k$.

$$(2k)^2 + (3k)^2 + (4k)^2 = 725$$

$$\Rightarrow 4k^2 + 9k^2 + 16k^2 = 725$$

$$\Rightarrow 29k^2 = 725 \Rightarrow k^2 = \frac{725}{29} = 25$$

$$\Rightarrow k = 5$$

$$\text{Numbers: } 2 \times 5 = 10, 3 \times 5 = 15, 4 \times 5 = 20$$

$$\text{Sum} = 9k = 9 \times 5 = 45$$

Ans: 10, 15, 20; sum = 45

4. The first, second and fourth terms of a proportion are 8, 20 and 45 respectively. Find the third term. [1]

$$8 : 20 = x : 45$$

$$\frac{8}{20} = \frac{x}{45}$$

$$x = \frac{8 \times 45}{20} = 18$$

Ans: 18

5. Find the third proportional to 9 and 15. [2]

Let the third proportional be c . Then $9 : 15 :: 15 : c$.

$$9 \times c = 15 \times 15$$

$$c = \frac{225}{9} = 25$$

Ans: 25

6. If 15 pens cost ₹210, find the cost of one pen. [1]

$$15 \text{ pens} \rightarrow ₹210$$

$$1 \text{ pen} \rightarrow ₹\frac{210}{15} = 14$$

Ans: ₹14

7. A man working 6 hours a day takes 10 days to complete a job. How many hours a day must he work to complete it in 12 days? [3]

Days | Hours per day

10 | 6

12 | y

Inverse proportion: $x_1y_1 = x_2y_2$

$$12 \times y = 10 \times 6 \Rightarrow y = \frac{10 \times 6}{12} = 5$$

Ans: 5 hours

8. Express the ratio 3 : 5 as a percentage. [1]

$$3 : 5 = \frac{3}{5}$$

$$\frac{3}{5} = \left(\frac{3}{5} \times 100 \right) \% = 60\%$$

Ans: 60%

9. If 45% of a number is 21 less than 60% of that number, find the number. [2]

Let the number be x .

$$45\% \text{ of } x = 60\% \text{ of } x - 21$$

$$\Rightarrow \frac{45x}{100} = \frac{60x}{100} - 21$$

$$\Rightarrow 21 = \frac{15x}{100} \Rightarrow x = \frac{21 \times 100}{15} = 140$$

Ans: 140

10. The price of a scooter rose from ₹56,000 to ₹63,000. Find the increase in price and the percentage increase. [3]

$$\text{Increase} = 63,000 - 56,000 = 7000$$

$$\% \text{ of increase} = \left(\frac{7000}{56,000} \times 100 \right) \% = 12.5\%$$

Ans: Increase ₹7000; 12.5%

11. The price of petrol rises by 10%. By how much percent must a family reduce its consumption so as not to increase its expenditure? [2]

$$\text{Reduction in consumption} = \left[\frac{R}{100+R} \times 100 \right] \%$$

$$= \left(\frac{10}{110} \times 100 \right) \% = 9\frac{1}{11}\%$$

Ans: $9\frac{1}{11}\%$

12. A dealer buys 150 quintals of rice at ₹2400 a quintal. He spends ₹15,000 on transport and storage. He sells the rice at ₹27 per kg. Find his profit or loss, and its percentage. (1 quintal = 100 kg) [5]

$$\text{C.P} = 150 \times 2400 + 15,000 = 3,75,000$$

$$\text{S.P} = 27 \times 100 \times 150 = 4,05,000$$

$$\text{S.P} > \text{C.P}, \text{ Profit} = 4,05,000 - 3,75,000 = 30,000$$

$$\text{Profit \%} = \left(\frac{30,000}{3,75,000} \times 100 \right) \% = 8\%$$

Ans: Profit ₹30,000; 8%

13. The cost price of an article is ₹540 and the percent markup is 25%. What is the marked price? [3]

$$\text{M.P} = 540 + 25\% \text{ of } 540$$

$$= 540 + \frac{25}{100} \times 540 = 540 + 135 = 675$$

Ans: ₹675

14. A shopkeeper says he sells rice at cost price, but he gives only 960 g for every kg. Find his gain percent. [2]

$$\text{Gain \%} = \left(\frac{\text{Error}}{\text{True value} - \text{Error}} \times 100 \right) \%$$

$$\text{Error} = 1000 - 960 = 40 \text{ g}$$

$$\text{Gain \%} = \left(\frac{40}{1000 - 40} \times 100 \right) \% = \left(\frac{40}{960} \times 100 \right) \% = 4\frac{1}{6}\%$$

Ans: $4\frac{1}{6}\%$

15. The average of 12 numbers is 18.5. Find their sum. [1]

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

$$\text{Sum} = 12 \times 18.5 = 222$$

Ans: 222

16. The average age of a family of 5 members is 24 years. If the age of the youngest member is 8 years, what was the average age of the family at the birth of the youngest member? [5]

$$x_1 + \dots + x_5 = 24(5) = 120, \text{ and the youngest is } 8.$$

$$\text{The other 4 members: } x_1 + \dots + x_4 = 120 - 8 = 112$$

8 years ago each of them was 8 years younger.

$$\text{Required average} = \frac{112 - 8(4)}{4} = \frac{112 - 32}{4} = \frac{80}{4} = 20$$

Ans: 20 years

17. Convert 25 m/s into km/h. [1]

$$1 \text{ m/s} = \frac{18}{5} \text{ km/h}$$

$$25 \text{ m/s} = 25 \times \frac{18}{5} = 90 \text{ km/h}$$

Ans: 90 km/h

18. Udai travels half of his journey by train at 90 km/h and the rest by car at 60 km/h. Find his average speed. [3]

$$\text{For equal distances at speeds } s_1 \text{ and } s_2: \text{average speed} = \frac{2s_1s_2}{s_1 + s_2}$$

$$= \frac{2 \times 90 \times 60}{90 + 60} = \frac{10,800}{150} = 72 \text{ km/h}$$

Ans: 72 km/h

19. Find the amount on ₹1500 at 8% per annum simple interest for $2\frac{1}{2}$ years. [2]

$$P = 1500, R = 8\%, T = 2\frac{1}{2} = \frac{5}{2} \text{ years}$$

$$\text{S.I} = \frac{P \times T \times R}{100} = \frac{1500 \times \frac{5}{2} \times 8}{100} = 300$$

$$\text{Amount} = P + \text{S.I} = 1500 + 300 = 1800$$

Ans: ₹1800

20. Find the amount and the compound interest on ₹15,625 for 3 years at 4% per annum, compounded annually. [5]

$$\begin{aligned}A &= P \left(1 + \frac{R}{100}\right)^n \\&= 15,625 \left(1 + \frac{4}{100}\right)^3 = 15,625 \times \left(\frac{26}{25}\right)^3 \\&= 17,576 \\C.I &= A - P = 17,576 - 15,625 = 1951\end{aligned}$$

Ans: Amount ₹17,576; C.I ₹1951
