

Arithmetic (Level 1)**Question Paper, Set 05**

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 $56 : 72$ in its simplest form. [1 mark]
2. Divide ₹2275 between two brothers in the ratio $6 : 7$. [2 marks]
3. Metal A is 20 times as heavy as water and metal B is 6 times as heavy as water. In what ratio should these be mixed to get an alloy 16 times as heavy as water? [5 marks]
4. Find the fourth proportional to 4, 10 and 18. [1 mark]
5. If 25, x , x , 64 are in proportion, find x . [2 marks]
6. A car uses 8 litres of petrol to travel 120 km. How far does it travel on 1 litre? [1 mark]
7. A tank can be filled in 36 minutes by 15 pumps. If 6 pumps go out of order, how long will the remaining pumps take to fill it? [3 marks]
8. Express 64% as a fraction in its simplest form. [1 mark]
9. What percent of a day is 9 hours? [2 marks]
10. (i) By what percent is 75 more than 60? (ii) By what percent is 60 less than 75? [3 marks]
11. p is 5 times as large as q . By what percent is q less than p ? [2 marks]
12. A dealer sold 400 quintals of sugar at a profit of 6%. If a quintal of sugar cost him ₹3500, find his total profit and the selling price. [5 marks]
13. The marked price of an article is ₹690 and the markup percentage is 15%. What is the cost price? [3 marks]
14. Two cycles are sold for ₹3910 each. One is sold at a profit of 15% and the other at a loss of 15%. Find the gain or loss percent on the whole. [2 marks]
15. Find the average of the first 10 natural numbers. [1 mark]
16. A batsman makes a score of 85 runs in the 17th innings and thus increases his average by 3. Find his average after the 17th innings. [5 marks]

17. Convert 162 km/h into m/s. [1 mark]
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18. A man covers three equal distances at speeds of 10 km/h, 20 km/h and 60 km/h. Find his average speed for the whole journey. [3 marks]
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19. Find the simple interest on ₹1600 at $4\frac{1}{2}\%$ per annum for 2 years. [2 marks]
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20. The bacteria in a culture grow by 20% in the first hour, decrease by 10% in the second hour and grow by 5% in the third hour. If the original count is 50000, find the count at the end of 3 hours. [5 marks]
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Key sheet

Q	Answer
1	7 : 9
2	₹1050 and ₹1225
3	5 : 2
4	45
5	$x = 40$
6	15 km
7	60 minutes
8	$\frac{16}{25}$
9	37.5%
10	(i) 25% (ii) 20%
11	80%
12	Profit ₹84,000; S.P ₹14,84,000
13	₹600
14	Loss of 2.25%
15	5.5
16	37
17	45 m/s
18	18 km/h
19	₹144
20	56,700

Solutions

1. Express 56 : 72 in its simplest form. [1]

H.C.F of 56 and 72 is 8.

$$\frac{56}{72} = \frac{8 \times 7}{8 \times 9} = \frac{7}{9}$$

Simplest form = 7 : 9

Ans: 7 : 9

2. Divide ₹2275 between two brothers in the ratio 6 : 7. [2]

Sum of the terms of the ratio = $6 + 7 = 13$

First part = $\frac{6}{13} \times 2275 = 1050$

Second part = $\frac{7}{13} \times 2275 = 1225$

Ans: ₹1050 and ₹1225

3. Metal A is 20 times as heavy as water and metal B is 6 times as heavy as water. In what ratio should these be mixed to get an alloy 16 times as heavy as water? [5]

Let 1 g of metal A be mixed with x g of metal B; the alloy is $(1 + x)$ g.

$$20w + x(6w) = (1 + x)16w$$

$$\Rightarrow 20w - 16w = x(16w) - x(6w)$$

$$\Rightarrow 4w = x(10w) \Rightarrow x = \frac{4}{10} = \frac{2}{5}$$

Required ratio = $1 : x = 1 : \frac{2}{5} = 5 : 2$

Ans: 5 : 2

4. Find the fourth proportional to 4, 10 and 18. [1]

Let the fourth proportional be x . Then $4 : 10 :: 18 : x$.

$$4 \times x = 10 \times 18$$

$$x = \frac{10 \times 18}{4} = 45$$

Ans: 45

5. If 25, x , x , 64 are in proportion, find x . [2]

$$\frac{25}{x} = \frac{x}{64}$$

$$x^2 = 25 \times 64 = 1600$$

$$x = \sqrt{1600} = 40$$

Ans: $x = 40$

6. A car uses 8 litres of petrol to travel 120 km. How far does it travel on 1 litre? [1]

8 litres $\rightarrow$ 120 km

1 litre $\rightarrow \frac{120}{8} = 15$ km

Ans: 15 km

7. A tank can be filled in 36 minutes by 15 pumps. If 6 pumps go out of order, how long will the remaining pumps take to fill it? [3]

$$\text{Remaining pumps} = 15 - 6 = 9$$

Pumps | Time (min)

$$15 \mid 36$$

$$9 \mid y$$

Inverse proportion: $x_1y_1 = x_2y_2$

$$9 \times y = 15 \times 36 \Rightarrow y = \frac{15 \times 36}{9} = 60$$

Ans: 60 minutes

8. Express 64% as a fraction in its simplest form. [1]

$$64\% = \frac{64}{100} = \frac{16}{25}$$

Ans: $\frac{16}{25}$

9. What percent of a day is 9 hours? [2]

$$1 \text{ day} = 24 \text{ hours}$$

$$\left(\frac{9}{24} \times 100\right)\% = 37.5\%$$

Ans: 37.5%

10. (i) By what percent is 75 more than 60? (ii) By what percent is 60 less than 75? [3]

$$\begin{aligned} & \text{(i) } \left[\frac{\text{Greater}-\text{smaller}}{\text{smaller}} \times 100\right]\% \\ & = \left(\frac{75-60}{60} \times 100\right)\% = \left(\frac{15}{60} \times 100\right)\% = 25\% \end{aligned}$$

$$\begin{aligned} & \text{(ii) } \left[\frac{\text{Greater}-\text{smaller}}{\text{Greater}} \times 100\right]\% \\ & = \left(\frac{15}{75} \times 100\right)\% = 20\% \end{aligned}$$

Ans: (i) 25% (ii) 20%

11. p is 5 times as large as q . By what percent is q less than p ? [2]

$$\text{Let } q = x; \text{ then } p = 5x.$$

$$\text{Required } \% = \left(\frac{5x-x}{5x} \times 100\right)\% = \left(\frac{4}{5} \times 100\right)\% = 80\%$$

Ans: 80%

12. A dealer sold 400 quintals of sugar at a profit of 6%. If a quintal of sugar cost him ₹3500, find his total profit and the selling price. [5]

$$\text{C.P of 400 quintals} = 400 \times 3500 = 14,00,000$$

$$\text{Profit} = 6\% \text{ of } 14,00,000 = \frac{6}{100} \times 14,00,000 = 84,000$$

$$\text{S.P} = \frac{100+6}{100} \times 14,00,000 = 14,84,000$$

Ans: Profit ₹84,000; S.P ₹14,84,000

13. The marked price of an article is ₹690 and the markup percentage is 15%. What is the cost price? [3]

$$\text{Let the C.P be } ₹x.$$

$$x + 15\% \text{ of } x = 690$$

$$\Rightarrow \frac{100x+15x}{100} = 690$$

$$\Rightarrow x = \frac{690 \times 100}{115} = 600$$

Ans: ₹600

14. Two cycles are sold for ₹3910 each. One is sold at a profit of 15% and the other at a loss of 15%. Find the gain or loss percent on the whole. [2]

When two articles have the same S.P, one at $a\%$ profit and the other at $a\%$ loss, there is always a loss of $\left(\frac{a}{10}\right)^2\%$.

$$\text{Loss \%} = \left(\frac{15}{10}\right)^2\% = 2.25\%$$

Check: C.P's are 3400 and 4600, total 8000; S.P total 7820; loss 180 on 8000.

Ans: Loss of 2.25%

15. Find the average of the first 10 natural numbers. [1]

The numbers are 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

$$\begin{aligned}\text{Average} &= \frac{\text{Sum of observations}}{\text{No. of observations}} \\ &= \frac{1+2+3+4+5+6+7+8+9+10}{10} = \frac{55}{10} = 5.5\end{aligned}$$

Ans: 5.5

16. A batsman makes a score of 85 runs in the 17th innings and thus increases his average by 3. Find his average after the 17th innings. [5]

Let the average of the first 16 innings be P .

$$\frac{16P+85}{17} = P + 3$$

$$\Rightarrow 16P + 85 = 17P + 51$$

$$\Rightarrow P = 85 - 51 = 34$$

$$\text{New average} = P + 3 = 37$$

Ans: 37

17. Convert 162 km/h into m/s. [1]

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

$$162 \text{ km/h} = 162 \times \frac{5}{18} = 45 \text{ m/s}$$

Ans: 45 m/s

18. A man covers three equal distances at speeds of 10 km/h, 20 km/h and 60 km/h. Find his average speed for the whole journey. [3]

$$\text{For three equal distances: average speed} = \frac{3s_1s_2s_3}{s_1s_2 + s_2s_3 + s_3s_1}$$

$$= \frac{3 \times 10 \times 20 \times 60}{10 \times 20 + 20 \times 60 + 60 \times 10}$$

$$= \frac{36,000}{2000} = 18 \text{ km/h}$$

Ans: 18 km/h

19. Find the simple interest on ₹1600 at $4\frac{1}{2}\%$ per annum for 2 years. [2]

$$P = 1600, R = 4\frac{1}{2}\%, T = 2 \text{ years}$$

$$\text{S.I} = \frac{P \times T \times R}{100} = \frac{1600 \times 2 \times \frac{9}{2}}{100} = 144$$

Ans: ₹144

20. The bacteria in a culture grow by 20% in the first hour, decrease by 10% in the second hour and grow by 5% in the third hour. If the original count is 50000, find the count at the end of 3 hours. [5]

$$\begin{aligned}A &= P \left(1 + \frac{R_1}{100}\right) \left(1 + \frac{R_2}{100}\right) \left(1 + \frac{R_3}{100}\right) \\&= 50,000 \left(1 + \frac{20}{100}\right) \left(1 - \frac{10}{100}\right) \left(1 + \frac{5}{100}\right) \\&= 50,000 \times \frac{6}{5} \times \frac{9}{10} \times \frac{21}{20} \\&= 56,700\end{aligned}$$

Ans: 56,700
