EXPRESSWALA ACADEMY

Arithmetic (Level 1)

Question Paper, Set 04

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 $45 : 75$ in its simplest form. [1 mark]

2. Divide ₹4500 among three friends in the ratio $1 : 3 : 5$. [3 marks]

3. Are $4, 9, 12, 27$ in proportion? Give a reason. [1 mark]

4. Find the mean proportional between 9 and 16. [1 mark]

5. If $\frac{x}{y} = \frac{9}{4}$, find $\frac{x+y}{y}$. [2 marks]

6. An electric pole 9 m high casts a shadow of 6 m. Find the height of a tree that casts a shadow of 10 m under similar conditions. [2 marks]

7. There is food for 600 men for 25 days. After 5 days, how many more men should join so that the remaining food lasts for 16 more days? [5 marks]

8. Express 0.065 as a percentage. [1 mark]

9. What percent of 25 is 7? [1 mark]

10. The price of a mixer is ₹1350. It is decreased by 6%. Find the new price. [2 marks]

11. The present population of a city is 13,310. It has been increasing at the rate of 10% per annum. Find its population 3 years ago. [3 marks]

12. By selling an article for ₹612, a man loses 15%. Find the cost price. [2 marks]

13. A shopkeeper marks an article costing ₹600 at 30% above its cost price and then gives a discount of 10%. Find the marked price, the selling price and the profit percentage. [5 marks]

14. If the cost price of 12 articles is equal to the selling price of 15 articles, find the gain or loss percent. [3 marks]

15. Find the average of $48, 52, 61, 39$. [1 mark]

16. A bus travels from town A to town B at 45 km/h. It covers one-fourth of the total distance in 3 hours. Find the distance between A and B. [2 marks]

17. A car takes one-third of the time taken by a bus for the same journey. The bus takes 15 hours. If the speed of the car is 75 km/h, find the speed of the bus. [2 marks]

18. A train 150 m long crosses an electric pole in 9 seconds. Find its speed in km/h. [3 marks]

19. The simple interest is ₹243 and the amount is ₹1143 at 6% per annum. Find the principal and the time. [5 marks]

20. In a factory, the production of scooters rose from 25,000 to 28,090 in 2 years. Find the rate of growth per annum. [5 marks]

Key sheet

Q	Answer
1	$3 : 5$
2	₹500, ₹1500, ₹2500
3	Yes
4	12
5	$\frac{13}{4}$
6	15 m
7	150 more men
8	6.5%
9	28%
10	₹1269
11	$10{,}000$
12	₹720
13	M.P ₹780; S.P ₹702; profit 17%
14	Loss of 20%
15	50
16	540 km
17	25 km/h
18	60 km/h
19	Principal ₹900; time $4\frac{1}{2}$ years
20	6% per annum

Solutions

1. Express $45 : 75$ in its simplest form. [1]

H.C.F of 45 and 75 is 15.

$\frac{45}{75} = \frac{15\times3}{15\times5} = \frac{3}{5}$

Simplest form $= 3 : 5$

Ans: $3 : 5$

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2. Divide ₹4500 among three friends in the ratio $1 : 3 : 5$. [3]

Sum of the terms of the ratio $= 1 + 3 + 5 = 9$

$1\text{st share} = \frac{1}{9} \times 4500 = 500$

$2\text{nd share} = \frac{3}{9} \times 4500 = 1500$

$3\text{rd share} = \frac{5}{9} \times 4500 = 2500$

Ans: ₹500, ₹1500, ₹2500

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3. Are $4, 9, 12, 27$ in proportion? Give a reason. [1]

$\text{Product of extremes} = 4 \times 27 = 108$

$\text{Product of means} = 9 \times 12 = 108$

They are equal, so $4 : 9 :: 12 : 27$. Yes.

Ans: Yes

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4. Find the mean proportional between 9 and 16. [1]

$\text{Mean proportional} = \sqrt{9 \times 16} = \sqrt{144} = 12$

Ans: 12

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5. If $\frac{x}{y} = \frac{9}{4}$, find $\frac{x+y}{y}$. [2]

By componendo, if $\frac{a}{b} = \frac{c}{d}$ then $\frac{a+b}{b} = \frac{c+d}{d}$.

$\frac{x+y}{y} = \frac{9+4}{4} = \frac{13}{4}$

Ans: $\frac{13}{4}$

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6. An electric pole 9 m high casts a shadow of 6 m. Find the height of a tree that casts a shadow of 10 m under similar conditions. [2]

Shadow (m) | Height (m)

6 | 9

10 | y

Direct proportion: $x_1 y_2 = x_2 y_1$

$6 \times y = 10 \times 9 \Rightarrow y = \frac{10\times9}{6} = 15$

Ans: 15 **m**

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7. There is food for 600 men for 25 days. After 5 days, how many more men should join so that the remaining food lasts for 16 more days? [5]

Total food $= 600 \times 25 = 15{,}000$ man-days

Food used in 5 days $= 600 \times 5 = 3000$ man-days

$\text{Remaining food} = 15{,}000 - 3000 = 12{,}000$

Men it can feed for 16 days $= \frac{12{,}000}{16} = 750$

$\text{More men} = 750 - 600 = 150$

Ans: 150 **more men**

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8. Express 0.065 as a percentage. [1]

$0.065 = (0.065 \times 100)\% = 6.5\%$

Ans: 6.5%

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9. What percent of 25 is 7? [1]

$\left(\frac{7}{25} \times 100\right)\% = 28\%$

Ans: 28%

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10. The price of a mixer is ₹1350. It is decreased by 6%. Find the new price. [2]

Final value after an decrease of $6\% = \left(\frac{100-R}{100}\right) P$

$= \frac{100-6}{100} \times 1350 = \frac{94}{100} \times 1350 = 1269$

Ans: ₹1269

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11. The present population of a city is 13,310. It has been increasing at the rate of 10% per annum. Find its population 3 years ago. [3]

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

$= \frac{13{,}310}{\left(1+\frac{10}{100}\right)^3} = \frac{13{,}310}{\left(\frac{11}{10}\right)^3}$

$= 13{,}310 \times \frac{10}{11} \times \frac{10}{11} \times \frac{10}{11} = 10{,}000$

Ans: $10{,}000$

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12. By selling an article for ₹612, a man loses 15%. Find the cost price. [2]

$\text{C.P} = \frac{100}{100-\text{Loss}\%} \times \text{S.P}$

$= \frac{100}{100-15} \times 612 = \frac{100}{85} \times 612 = 720$

Ans: ₹720

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13. A shopkeeper marks an article costing ₹600 at 30% above its cost price and then gives a discount of 10%. Find the marked price, the selling price and the profit percentage. [5]

$\text{M.P} = 600 + 30\% \text{ of } 600 = 780$

$\text{S.P} = \frac{100-10}{100} \times 780 = 702$

$\text{Profit} = 702 - 600 = 102$

$\text{Profit } \% = \left(\frac{102}{600} \times 100\right)\% = 17\%$

Ans: M.P ₹780; S.P ₹702; profit 17%

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14. If the cost price of 12 articles is equal to the selling price of 15 articles, find the gain or loss percent. [3]

Let C.P of each $= x$ and S.P of each $= y$.
$12x = 15y \Rightarrow \frac{y}{x} = \frac{12}{15} = \frac{4}{5}$
$y < x$, so there is a loss.
$\text{Loss } \% = \left(1 - \frac{y}{x}\right) \times 100 = 20\%$
Ans: Loss of 20%

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15. Find the average of $48, 52, 61, 39$. [1]

$\text{Average} = \frac{\text{Sum of observations}}{\text{No. of observations}}$
$= \frac{48+52+61+39}{4} = \frac{200}{4} = 50$
Ans: 50

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16. A bus travels from town A to town B at 45 km/h. It covers one-fourth of the total distance in 3 hours. Find the distance between A and B. [2]

Let $AB = x$. It covers $\frac{x}{4}$ in 3 h.
$S = \frac{D}{T} \Rightarrow 45 = \frac{x/4}{3}$
$\Rightarrow x = 45 \times 3 \times 4 = 540 \text{ km}$
Ans: 540 **km**

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17. A car takes one-third of the time taken by a bus for the same journey. The bus takes 15 hours. If the speed of the car is 75 km/h, find the speed of the bus. [2]

$\frac{T_1}{T_2} = \frac{1}{3}$ (T_1 for the car, T_2 for the bus)
$s_1 : s_2 = T_2 : T_1 = 3 : 1$
$\text{Speed of bus} = \frac{75}{3} = 25 \text{ km/h}$
Ans: 25 **km/h**

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18. A train 150 m long crosses an electric pole in 9 seconds. Find its speed in km/h. [3]

To cross a pole, the train travels its own length.
$S = \frac{D}{T} = \frac{150}{9} = 16\frac{2}{3} \text{ m/s}$
$= 16\frac{2}{3} \times \frac{18}{5} = 60 \text{ km/h}$
Ans: 60 **km/h**

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19. The simple interest is ₹243 and the amount is ₹1143 at 6% per annum. Find the principal and the time. [5]

$\text{Amount} = P + \text{S.I} \Rightarrow 1143 = P + 243$
$P = 1143 - 243 = 900$
$\text{S.I} = \frac{P \times T \times R}{100} \Rightarrow 243 = \frac{900 \times T \times 6}{100}$
$T = \frac{243 \times 100}{900 \times 6} = 4\frac{1}{2} \text{ years}$
Ans: Principal ₹900; time $4\frac{1}{2}$ years

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20. In a factory, the production of scooters rose from 25,000 to 28,090 in 2 years. Find the rate of growth per annum. [5]

$A = P\left(1 + \frac{R}{100}\right)^n$

$28{,}090 = 25{,}000\left(1 + \frac{R}{100}\right)^2$

$\Rightarrow \left(1 + \frac{R}{100}\right)^2 = \frac{28{,}090}{25{,}000} = \frac{2809}{2500} = \left(\frac{53}{50}\right)^2$

$\Rightarrow 1 + \frac{R}{100} = \frac{53}{50} \Rightarrow \frac{R}{100} = \frac{3}{50}$

$\Rightarrow R = 6\%$

Ans: 6% per annum