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PRACTICE PAPER 1 (2023-24)
DIRECT AND INVERSE PROPORTION (ANSWERS)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**
CLASS : VIII **DURATION : 1½ hr**

General Instructions:
(i). **All** questions are compulsory.
(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.
(iii). **Section A** comprises of **6 MCQs** of **1 mark** each. **Section B** comprises of **1 CCT question** of **4 marks** each which contains **4 MCQs**. **Section C** comprises of 3 questions of **2 marks** each. **Section D** comprises of 4 questions of **3 marks** each and **Section E** comprises of 3 questions of **4 marks** each.

SECTION – A
Questions 1 to 6 carry 1 mark each.

1. By travelling at a speed of 48 kilometres per hour, a car can finish a certain journey in 10 hours. To cover the same distance in 8 hours, the speed of the car should be
(a) 60 km/h (b) 80 km/h (c) 30 km/h (d) 40 km/h
Ans: (a) 60 km/h
Speed of car = 48 km/hr and Time taken = 10 hr
As we know, Distance = speed × time = 48 × 10 = 480 km
The speed required by a car to cover 480 km in 8 hours = 480/8 = 60 km/hr.

2. A truck needs 54 litres of diesel to cover a distance of 297 km. The diesel required by the truck to cover a distance of 550 km is
(a) 100 litres (b) 50 litres (c) 25.16 litres (d) 25 litres
Ans: (a) 100 litres
Distance covered by the truck using 54 litres of diesel = 297 km
Distance covered by truck using 1 litre diesel = 297/54 = 5.5 km
Hence, for 550 km, diesel required = 550/5.5 = 100 litres

3. If the distance travelled by a rickshaw in one hour is 10 km, then the distance travelled by the same rickshaw with the same speed in one minute is:
(a) 250/9 m (b) 500/9 m (c) 1000 m (d) 500/3 m
Ans: (d) 500/3 m
Distance travelled = 10km
Time taken = 1 hr
In one minute, distance covered = 10/60 km = (10×1000)/60 m = 500/3 m

4. If $x \propto y$ and $x_1 = 5$, $y_1 = 210$ and $x_2 = 2$, then find y_2?
(a) 200 (b) 84 (c) 99 (d) 70
Ans: (b) 84
$x \propto y \Rightarrow x/y = \text{constant}$
$\Rightarrow x_1/y_1 = x_2/y_2 \quad \Rightarrow 5/210 = 2/y_2 \qquad \Rightarrow y_2 = 84$

5. 6 pipes are required to fill a tank in 1 hour 20 minutes. If we use 5 such types of pipes, how much time it will take to fill the tank?
(a) 120 minutes (b) 96 minutes (c) 80 minutes (d) 85 minutes
Ans: (b) 96 minutes

For 6 pipes, it takes 1 hour 20 minutes
1 hour 20 minutes = 60 + 20 = 80 minutes
For 5 pipes, let the time taken be x.
This is inverse proportion case:
$\Rightarrow 80 \times 6 = x \times 5$
$\Rightarrow x = 480/5 = 96$

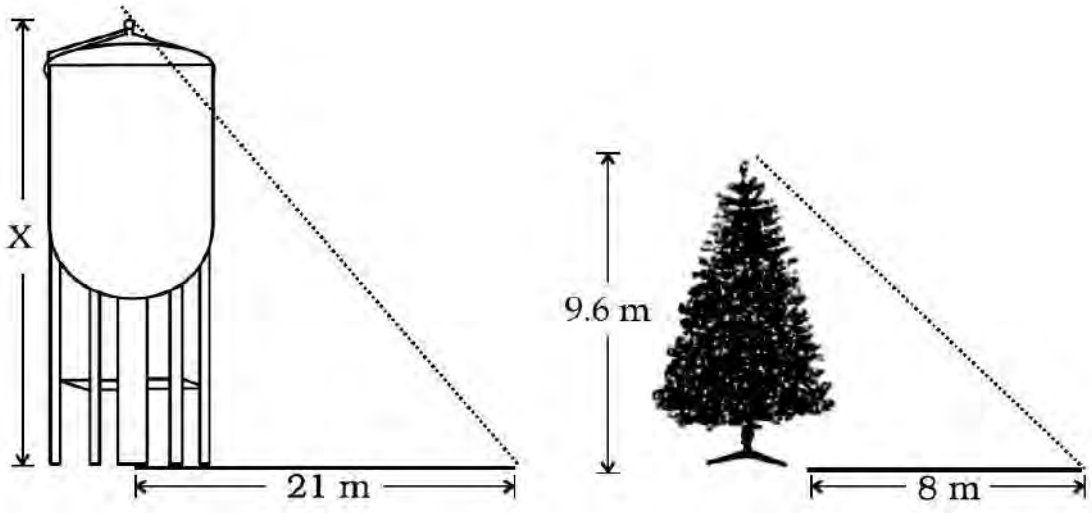
6. 100 persons had food provision for 24 days. If 20 persons left the place, the provision will last for
(a) 30 days (b) 96/5 days (c) 120 days (d) 40 days
Ans: (a) 30 days
100 persons have food provision for = 24 days
1 person will have food provision for = 24×100 = 2500 days
If 20 persons left the place, then the total left = 100-20 = 80 persons
Hence, 80 persons have food provision for = 2400/80 = 30 days

SECTION – B(CCT Questions)

Questions 7 to 10 carry 1 mark each.

CCT Question

One day Maths teacher explaining about Direct and Inverse proportion with the help of many examples. He has given the example of relation between the length of shadow and height of the water tank and height. A water tank casts a shadow 21 m long. A tree of height 9.6 m casts a shadow 8 m long at the same time.



Answer the following questions based on the above information:

7. Find the height of the water tank in the above situation.
(a) 24.9 m (b) 25.2 m (c) 32 m (d) 31.5 m
Ans: (b) 25.2 m
According to the given condition in the question, the length of the shadows are in direct proportion.

$$\therefore \frac{8}{9.6} = \frac{21}{x} \Rightarrow x = \frac{21 \times 9.6}{8} = \frac{201.6}{8} = 25.2\,\text{m}$$

8. A water tank casts a shadow 27 m long. A tree of height 10.5 m casts a shadow 9 m long at the same time. The lengths of the shadows are directly proportional to their heights. Find the height of the tank.
(a) 24.9 m (b) 25.2 m (c) 32 m (d) 31.5 m

Ans: (d) 31.5 m

According to the given condition in the question, the length of the shadows are in direct proportion.

$$\therefore \frac{9}{10.5} = \frac{27}{x} \Rightarrow x = \frac{27 \times 10.5}{9} = \frac{283.5}{9} = 31.5\,\text{m}$$

9. A vertical pole of a length 6 m casts a shadow 4m long on the ground and at the same time a tower casts a shadow 28 m long. Find the height of the tower.

(a) 44 m (b) 40 m (c) 42 m (d) 48 m

Ans: (c) 42 m

According to the given condition in the question, the length of the shadows are in direct proportion.

$$\therefore \frac{6}{4} = \frac{x}{28} \Rightarrow x = \frac{28 \times 6}{4} = 42\,\text{m}$$

10. A vertical stick 12 m long casts a shadow 8 m long on the ground. At the same time, a tower casts a shadow of length 40 m on the ground . Determine the height of the tower.

(a) 44 m (b) 60 m (c) 42 m (d) 64 m

Ans: (b) 60 m

According to the given condition in the question, the length of the shadows are in direct proportion.

$$\therefore \frac{12}{8} = \frac{x}{40} \Rightarrow x = \frac{12 \times 40}{8} = 60\,\text{m}$$

SECTION – C

Questions 11 to 13 carry 2 marks each.

11. A machine in a soft drink factory fills 840 bottles in six hours. How many bottles will it fill in five hours?

Ans: Let the number of bottles filled in five hours be x.

Here, the ratio of hours and bottles is in direct proportion.

$\therefore \frac{6}{840} = \frac{5}{x} \Rightarrow 6x = 5 \times 840$

$\Rightarrow x = 5 \times 840/6 = 700$

Hence, the machine will fill 700 bottles in five hours.

12. A batch of bottles was packed in 25 boxes, with 12 bottles in each box. If the same batch is packed using 20 bottles in each box, how many boxes would be filled?

Ans: Here, the number of bottles and the number of boxes are in inverse proportion.

$12 \times 25 = 20x$

$\Rightarrow x = 12 \times 25/20 = 15$

Hence, 15 boxes would be filled.

13. A school has 8 periods a day, each of 45 minutes duration. How long would each period be, if the school has 9 periods a day, assuming the number of school hours to be the same?

Ans: Here, the number of periods and the duration of periods are in inverse proportion.

We have, $8 \times 45 = 9x \Rightarrow x = 40$

Hence, the duration of each period would be 40 minutes.

SECTION – D

Questions 14 to 17 carry 3 marks each.

14. There are 100 students in a hostel. Food provision for them is for 20 days. How long will these provisions last, if 25 more students join the group?

Ans: Suppose the provisions last for y days when the number of students is 125.

Ans: Here, more the number of students, the sooner would the provisions exhaust.

Therefore, this is a case of inverse proportion.

So, $100 \times 20 = 125 \times y$

$\Rightarrow 100 \times 20 / 125 = y$

$\Rightarrow 16 = y$

Thus, the provisions will last for 16 days, if 25 more students join the hostel.

15. If y varied inversely as x, and if y = 4 when x = 72, find the following:

(a) the constant of variation

(b) the value of y when x = 9.

Ans:

(a) Let $xy = k$, where k is the constant of variation.

Since $y = 4$ when $x = 72$, $\quad k = xy = 72 \times 4 = 288.$

$\therefore$ The constant of variation is **288.**

(b) Since $k = 288$ and $x = 9$, $\quad y = \dfrac{k}{x} = \dfrac{288}{9} = 32$

$\therefore$ When $x = 9$, the value of y is **32**.

16. 11 men dig a trench $6\frac{3}{4}$ metres long in one day. How many men should be employed for digging a trench 27 metres long of the same type in one day?

Ans:

Let the number of men required be x. Then, we have the following table:

Number of men	11	x
Length of trench (in metres)	$6\frac{3}{4}$	27

More men → more length can be dug so direct proportion

Since the length of the trench dug and number of persons employed are in direct variation or proportion, so

$$\frac{11}{6\frac{3}{4}} = \frac{x}{27} \Rightarrow \quad \Rightarrow \frac{27}{4}x = 11 \times 27 \quad \Rightarrow \quad x = 11 \times 27 \times \frac{4}{27} = 44.$$

Hence, the required number of persons = 44.

17. It is given that s varies directly to q.

(a) Write an equation that specifies the variation and find the constant of variation is s is 4 when q is 6.

(b) Find s when q is 15.

(c) Find q when s is 12.

Ans:

(a) $s = kq$, where k is the constant of variation. $4 = k \times 6 \Rightarrow k = \frac{4}{6} = \mathbf{\frac{2}{3}}$.

(b) $s = \frac{2}{3}q \ \therefore \ s = \frac{2}{3} \times 15 \Rightarrow s = \mathbf{10}$ (c) $s = \frac{2}{3}q \ \therefore \ 12 = \frac{2}{3}q \Rightarrow q = 12 \times \frac{3}{2} = \mathbf{18.}$

SECTION – E

Questions 18 to 20 carry 4 marks each.

18. The cost of 5 metres of a particular quality of cloth is Rs 210. Tabulate the cost of 2, 4, 10 and 13 metres of cloth of the same type.

Ans: Suppose the length of cloth is x metres and its cost, in Rs, is y.

x	2	4	5	10	13
y	y_2	y_3	210	y_4	y_5

As the length of cloth increases, cost of the cloth also increases in the same ratio. It is a case of direct proportion.

(i) Here $x_1 = 5, \ y_1 = 210$ and $x_2 = 2$

Therefore, $\frac{x_1}{y_1} = \frac{x_2}{y_2}$ gives $\frac{5}{210} = \frac{2}{y_2}$ or $5y_2 = 2 \times 210$ or $y_2 = \frac{2 \times 210}{5} = 84$

(ii) If $x_3 = 4$, then $\frac{5}{210} = \frac{4}{y_3}$ or $5y_3 = 4 \times 210$ or $y_3 = \frac{4 \times 210}{5} = 168$

(iii) If $x_4 = 10$, then $\frac{5}{210} = \frac{10}{y_4}$ or $y_4 = \frac{10 \times 210}{5} = 420$

(iv) If $x_5 = 13$, then $\frac{5}{210} = \frac{13}{y_5}$ or $y_5 = \frac{13 \times 210}{5} = 546$

19. A train is moving at a uniform speed of 75 km/hour.

(i) How far will it travel in 20 minutes?

(ii) Find the time required to cover a distance of 250 km.

Ans: Let the distance travelled (in km) in 20 minutes be x and time taken (in minutes) to cover 250 km be y.

Distance travelled (in km)	75	x	250
Time taken (in minutes)	60	20	y

Since the speed is uniform, therefore, the distance covered would be directly proportional to time.

(i) We have $\frac{75}{60} = \frac{x}{20} \Rightarrow \frac{75}{60} \times 20 = x$

$\Rightarrow$ x = 25

So, the train will cover a distance of 25 km in 20 minutes.

(ii) We have $\frac{75}{60} = \frac{250}{y} \Rightarrow y = \frac{250 \times 60}{75}$

$\Rightarrow$ y = 200 minutes or 3 hours 20 minutes

Therefore, 3 hours 20 minutes will be required to cover a distance of 250 kilometres.

20. It is known that for a given mass of gas, the volume V varies inversely as the pressure P. Fill in the missing entries in the following table:

	(a)	(b)	(c)	(d)	(e)
V (in cm^3)	?	48	60	?	100
P (in atmosphere)	2	?	3/2	1	?

Ans:

The volume (V) of the gas varies inversely as the pressure (P).

$\therefore \quad PV = k$

$\therefore$ From (c) $\frac{3}{2} \times 60 = k$, *i.e.*, $k = 90$.

(a) For $P = 2$, $2 \times V = 90 \therefore \quad V = \frac{90}{2} = 45$.

(b) For $V = 48$; $P \times 48 = 90 \therefore \quad P = \frac{90}{48} = \frac{15}{8}$.

(d) For $P = 1$, $1 \times V = 90 \therefore \quad V = 90$.

(e) For $V = 100$, $P \times 100 = 90$

$\therefore \quad P = \frac{90}{100} = \frac{9}{10}$ or 0.9