

NCERT SOLUTIONS CLASS-8 MATHS

CHAPTER-13 EXERCISE-13.1

Remove Watermark Now

Q1: Following are the car parking charges near railway station according to the hours:



4 hours	Rs. 60
8 hours	Rs 100
12 hours	Rs 140
24 hours	Rs 180

Check if the parking charges are in direct proportion to the parking time.

Sol:

Let the charges be C_1, C_2, C_3, C_4

$$C_1 = \frac{60}{4} = 15 \quad C_2 = \frac{100}{8} = 12.50 \quad C_3 = \frac{140}{12} = 11.67 \quad C_4 = \frac{180}{24} = 7.50$$

Therefore the charges per hour are not same as $C_1 \neq C_2 \neq C_3 \neq C_4$.

Therefore, the parking charges are not in direct proportion to the parking time.

Q2: A mixture of paint is made by adding 1 part of red pigments to the 8 parts of base. In the table given below, find the parts of base that needs to be added.

Parts of red pigment	1	4	7	12	20
Parts of base	8

Sol:

The ratio of parts of red pigment and parts of base share a common ratio. Let us assume the common ratio to be r .

$$\text{So, } r = \frac{x}{y} = \frac{\text{parts of red pigment}}{\text{parts of base}}$$

$$\text{When } x_1 = 1, y_1 = 8$$

$$\Rightarrow r = \frac{x_1}{y_1} = \frac{1}{8} \quad (\text{Given})$$

$$x_2 = 4, y_2 = ?$$

$$(\text{as, } r = \frac{1}{8})$$

$$r = \frac{x_2}{y_2} = \frac{1}{8} \quad \frac{4}{y_2} = \frac{1}{8} \quad y_2 = \frac{8}{1} \times 4 = 32$$

$$x_3 = 7, y_3 = ?$$

$$(\text{as, } r = \frac{1}{8})$$

$$r = \frac{x_3}{y_3} = \frac{1}{8} \quad \frac{7}{y_3} = \frac{1}{8} \quad y_3 = \frac{8}{1} \times 7 = 56$$

$$x_4 = 12, y_4 = ?$$

$$(as, r = \frac{1}{8})$$

$$r = \frac{x_4}{y_4} = \frac{1}{8} \quad \frac{12}{y_4} = \frac{1}{8} \quad y_4 = \frac{8}{1} \times 12 = 96$$

$$r = \frac{x_5}{y_5} = \frac{1}{8} \quad x_2 = 20, y_5 = ?$$

$$(as, r = \frac{1}{8})$$

$$r = \frac{x_5}{y_5} = \frac{1}{8} \quad \frac{20}{y_5} = \frac{1}{8} \quad y_5 = \frac{8}{1} \times 20 = 160$$

Thus the table is as follows:

Parts of red pigment	1	4	7	12	20
Parts of base	8	32	56	96	160

Q3: In the above question (Q2) , if 1 part of a red pigment requires 95 ml of base, how much red pigment should be mixed with 1900 ml of base?

Sol:

Let the parts of red pigment mixed with 1900 ml of base be 'a'.

Parts of red Pigment	1	a
Parts of base	95	1900

Since it is the case of direct proportion .

$$\therefore \frac{1}{95} = \frac{a}{1900} \Rightarrow 95 \times a = 1 \times 1900 \Rightarrow a = \frac{1 \times 1900}{95} = 20$$

Q4: A soft drink machine factory fills 910 bottles in 7 hours. How many bottles can be filled in 4 hours.

Sol:

Let the number of bottles filled in 4 hours be 'a'

Hours	7	4
Bottles	910	a

Hence ratio of bottles filled and time (hours) are in direct proportion.

$$\therefore \frac{7}{910} = \frac{4}{a} \Rightarrow 7 \times a = 4 \times 910 \Rightarrow a = \frac{4 \times 910}{7} = 4 \times 130$$

Therefore, the machine will fill 130 bottles in 4 hours.

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Q5: A photograph of a bacteria enlarged 80,000 times attains a length of 8 cm as shown in the diagram. What is the actual length of the bacteria? If the photograph is enlarged 30,000 times only, what would be its enlarged length?

Sol:

Let the enlarged length of bacteria be 'a'.

(i) Actual length of bacteria –

$$\frac{8}{80000} = \frac{1}{10000} = 0.0001 \text{ cm}$$

Length (cm)	8	a
Enlarged length	80000	30000

Here length and enlarged length of the bacteria are in direct relation.

$$\therefore \frac{8}{80000} = \frac{a}{30000}$$

$$\Rightarrow a \times 80000 = 8 \times 30000$$

$$\Rightarrow a = \frac{8 \times 30000}{80000} = 3 \text{ cm}$$

Q6: In a model of a ship, the mast is 6cm high, while the mast of the actual ship is 8m high. If the length of the ship is 20 m, how long will be the model ship.

Sol:

Let the length of model ship be 'a'.

Length of actual ship (in m)	8	20
Length of model ship (in cm)	6	a

Here length of mast and actual length of ship are in direct proportion.

$$\therefore \frac{8}{6} = \frac{20}{a} \therefore 8 \times a = 20 \times 6 \therefore a = \frac{20 \times 6}{8}$$

$$\therefore a = 15 \text{ cm}$$

Q7: If 5 kg of sugar contains 12×10^6 crystals. How many sugar crystal are there in 8 kg of sugar and 2 kg of sugar.

Sol:

Let sugar crystal be 'a' and 'b' in 8 kg and 2 kg of sugar.

Weight of sugar (kg)	5	8	2
No. of crystals	1.2×10^7	a	b

Here weight of sugar and number of sugar crystals are in direct proportion.

For 8 kg sugar the number of sugar crystals required will be:

$$\therefore \frac{5}{12 \times 10^6} = \frac{8}{a} \quad 5 \times a = 8 \times 12 \times 10^6 \quad a = \frac{8 \times 12 \times 10^6}{5} = 1.92 \times 10^7$$

For 2 kg sugar the number of sugar crystals required will be:

$$\therefore \frac{5}{12 \times 10^6} = \frac{2}{b} \quad 5 \times b = 2 \times 12 \times 10^6 \quad b = \frac{2 \times 12 \times 10^6}{5} = 4.8 \times 10^6$$

Q8: Arpita has a road map with a scale of 1 cm representing 16 km. She drives on a road for 96 km. What would be her distance covered in the map?

Sol:

Let the actual distance in the map be 'a'.

Actual distance (in km)	16	96
Distance covered in map (in cm)	1	a

Here actual distance and the distance covered in the map are in direct proportion.

$$\therefore \frac{16}{1} = \frac{96}{a} \Rightarrow a \times 16 = 96 \Rightarrow a = \frac{96}{16} = 6$$

Hence, the distance covered in the map is 6cm.

Q9: A 5 m 60 cm high vertical pole casts a shadow 3 m 20 cm long. Find at the same time

(i) the length of the shadow cast by another pole 10 m 50 cm high

(ii) the height of a pole which casts a shadow 5 m long.

Sol:

Here height of the pole and length of the shadow are in direct proportion.

And we know that 1m=100cm

5m 60 cm =560cm

3m 20 cm=320cm

10m 50cm=1050cm

(i). Let the length of the shadow of another pole be a .

Height of the pole (in cm)	560	1050
Length of shadow (in cm)	320	a

$$\therefore \frac{560}{320} = \frac{1050}{a} \Rightarrow a \times 560 = 1050 \times 320 \Rightarrow a = \frac{1050 \times 320}{560}$$

$$\Rightarrow a = 600 \text{ cm}$$

Or $a = 6\text{m}$

Length of the shadow of another pole is 6m.

(ii) Let the length of the shadow of another pole be ' b '.

Height of the pole (in cm)	560	b
Length of shadow (in cm)	320	500

$$\therefore \frac{560}{320} = \frac{b}{500} \Rightarrow b \times 320 = 500 \times 560 \Rightarrow b = \frac{560 \times 500}{320}$$

$$\Rightarrow b = 875 \text{ cm}$$

Or $b = 8\text{m } 75 \text{ cm}$

Thus the height of the shadow of another pole is 8m 75cm.

Q10: A loaded truck travels 10 km in 18 minutes. If the speed remains unchanged, what will be the distance covered in 4 hours?

Sol:

Let distance covered in 4 hours be x km

$$1 \text{ hour} = 60 \text{ minutes} \therefore 4 \text{ hour} = 240 \text{ minutes}$$

Distance (in km)	10	x
Time (in minute)	18	240

Here distance covered and time in direct proportion.

$$\therefore \frac{10}{18} = \frac{x}{240} \Rightarrow x \times 18 = 10 \times 240 \Rightarrow x = \frac{10 \times 240}{18}$$

$$\Rightarrow x = 133\frac{1}{3} \text{ km}$$

Hence the distance travelled in 4 hours is $\Rightarrow 133.333$.

Q3: Raj is making a tyre wheel using spokes. He wants that the angle between any of the consecutive spokes should be at same angle. Complete the following table:

No. of spokes	4	6	8	10	12
Angle formed by a pair of Consecutive spokes	90°	60°

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- (i) Do the spokes and the angles between the pairs of consecutive spokes shares a direct or an indirect relation?
- (ii) If the number of spokes is 15 then calculate the angle between pair of consecutive spokes.
- (iii) Calculate the number of spokes, if the angle between a pair of consecutive spokes is 40° ?

Sol:

Here the spoke count are increasing and the angle formed between a pair of adjacent spokes is decreasing. So, it is a inverse proportion and angle at the centre of a circle is 360° .

When the number of spokes is 8, then angle between a pair of consecutive spokes = $\frac{360^\circ}{8} = 45^\circ$

When the number of spokes is 10, then angle between a pair of consecutive spokes = $\frac{360^\circ}{36} = 10^\circ$

When the number of spokes is 12, then angle between a pair of consecutive spokes = $\frac{360^\circ}{12} = 30^\circ$

Spoke count	4	6	8	10	12
Angle formed by a pair of Consecutive spokes	90°	60°	45°	36°	30°

- (i) The number of spokes and the angles formed between a pair of consecutive spokes is in inverse proportion.
- (ii) When the number of spokes is 15, then angle between a pair of consecutive spokes = $\frac{360^\circ}{15} = 24^\circ$
- (iii) The number of spokes would be needed = $\frac{360^\circ}{40^\circ} = 9$

Q4: If a cake is distributed among 30 children, each child will get 5 pieces. How many pieces would each child get, if the 5 children didn't attended the birthday party?

Sol:

Given that, Each child gets = 5 pieces

30 children will get $30 \times 5 = 150$ pieces

Total number of pieces of a cake = 150

If the number of children is reduced by 5, then children left = $30 - 5 = 25$

So each child will get = $150/25 = 6$ pieces

Q5: A man has enough food to feed 30 animals in his cattle for 5 days. How long would the food last if there were 15 more animals in his cattle?

Sol:

Let the number of days be a.

Total number of animals = $30 + 15 = 45$

Animals	30	45
Days	5	a

Here, the number of animals and the number of days are in inverse proportion.

$$\therefore \frac{30}{45} = \frac{a}{5} \Rightarrow 30 \times a = 45 \times 5 \Rightarrow a = \frac{45 \times 5}{30} = 7.5$$

Hence, the food will last for 7.5 days.

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Q6: If 2 persons can repair a room in 12 days. Tell how long would it take for 3 persons for repairing the same room?

Sol:

Let time taken to complete the job be x

Persons	2	3
Days	12	x

Here the number of persons and the number of days are in inverse proportion.

$$\therefore \frac{2}{3} = \frac{x}{12} \Rightarrow 2 \times 3 = x \times 12 \Rightarrow x = \frac{12 \times 2}{3} = 8$$

Hence, it would take 8 days to repair a room

Q7: 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?

Sol:

Let the number of boxes be x.

No. of bottles in each box	12	20
Boxes	25	x

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

$$\therefore \frac{12}{20} = \frac{x}{25} \Rightarrow 20 \times x = 12 \times 25 \Rightarrow x = \frac{12 \times 25}{20} = 15$$

Hence, 15 boxes would be filled.

Q8: 40 machines working simultaneously produces a given number of articles in 65 days. If the work need to be completed in 52 days then how many machines would be required given that the articles produced need to be the same.

Sol:

Let the number of machines required be a.

Days	65	52
Machine	40	a

Here, the number of machines and the number of days are in inverse proportion.

$$\therefore \frac{65}{52} = \frac{a}{40} \Rightarrow 52 \times a = 65 \times 40 \Rightarrow a = \frac{65 \times 40}{52} = 50$$

Hence, 50 machines would be required.

Q9: It takes 3 hours for a car travelling at 70km/h to reach its destination. How much time would it take to reach the same destination when its speed is 90 km/hr?

Sol:

Let the number of hours be 'a'.

Speed (in km/h)	70	90
Time (in hours)	3	a

Here, the speed of car and time are in inverse proportion.

$$\therefore \frac{70}{90} = \frac{a}{3} \Rightarrow a \times 90 = 70 \times 3 \Rightarrow a = \frac{70 \times 3}{90} = \frac{7 \times 1}{3}$$

Hence, the car will take $2\frac{1}{3}$ hours to reach its destination.**Q10: Two men can fit new windows in a house in 4 days****(i) One of the persons fell ill before the work started. How long would the job take now?****(ii) How many person would be needed to fit the windows in a day?****Sol:****(i) Let the number of days be x**

Person	2	1
Days	4	x

Here, the number of persons and the number of days are in inverse proportion.

$$\therefore \frac{2}{1} = \frac{x}{4} \Rightarrow x \times 1 = 2 \times 4 \Rightarrow x = \frac{4 \times 2}{1} = 8$$

(ii) Let the number of persons be x.

Persons	2	x
Days	4	1

Here, the number of persons and the number of days are in inverse proportion.

$$\therefore \frac{2}{x} = \frac{1}{4} \Rightarrow x \times 1 = 2 \times 4 \Rightarrow x = \frac{4 \times 2}{1} = 8$$

Q11: A college has 7 periods a day each of 56 minutes duration. How long would each period be, if the school has 8 periods a day, assuming the number of school hours to be the same?**Sol:**

Let the duration of each period be 'a'.

Period	7	8
Duration of periods(in minutes)	56	a

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

$$\therefore \frac{7}{8} = \frac{a}{56} \Rightarrow a \times 8 = 7 \times 56 \Rightarrow a = \frac{7 \times 56}{8} = 49$$

Hence, the duration of each period would be 49 minutes