SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution

Coimbatore-35

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

23GET276 – VQAR II

II YEAR/ IV SEMESTER

UNIT 1 – QUANTITATIVE ABILITY III

TOPIC – CHAIN RULE

CHAIN RULE

1. **Direct Proportion:**

Two quantities are said to be directly proportional, if on the increase (or decrease) of the one, the other increases (or decreases) to the same extent.

Eg. Cost is directly proportional to the number of articles.
(More Articles, More Cost)

2. **Indirect Proportion:**

Two quantities are said to be indirectly proportional, if on the increase of the one, the orther decreases to the same extent and vice-versa.

Eg. The time taken by a car is covering a certain distance is inversely proportional to the speed of the car. (More speed, Less is the time taken to cover a distance.)

Note: In solving problems by chain rule, we compare every item with the term to be found out.

CHAIN RULE

3 pumps, working 8 hours a day, can empty a tank in 2 days. How many hours a day must 4 pumps work to empty the tank in 1 day?

A. 9

B. 10

C. 11

D. 12

Answer: Option **D**

Explanation:

Let the required number of working hours per day be x.

More pumps, Less working hours per day (Indirect Proportion)

Less days, More working hours per day (Indirect Proportion)

Pumps 4 : 3
Days 1 : 2
} :: 8 : x

$\therefore$ 4 x 1 x x = 3 x 2 x 8

$\Rightarrow x = \frac{(3 \times 2 \times 8)}{(4)}$

$\Rightarrow x = 12.$

CHAIN RULE

If the cost of x metres of wire is d rupees, then what is the cost of y metres of wire at the same rate?

A. Rs. $\left(\frac{xy}{d}\right)$

B. Rs. (xd)

C. Rs. (yd)

D. Rs. $\left(\frac{yd}{x}\right)$

Answer: Option **D**

Explanation:

Cost of x metres = Rs. d.

Cost of 1 metre = Rs. $\left(\frac{d}{x}\right)$

Cost of y metres = Rs. $\left(\frac{d}{x} \cdot y\right)$ = Rs. $\left(\frac{yd}{x}\right)$.

CHAIN RULE

Running at the same constant rate, 6 identical machines can produce a total of 270 bottles per minute. At this rate, how many bottles could 10 such machines produce in 4 minutes?

A. 648

B. 1800

C. 2700

D. 10800

Answer: Option **B**

Explanation:

Let the required number of bottles be x.

More machines, More bottles (Direct Proportion)

More minutes, More bottles (Direct Proportion)

$$\left.\begin{matrix}\text{Machines} & 6 : 10 \\ \text{Time (in minutes)} & 1 : 4\end{matrix}\right\} :: 270 : x$$

$\therefore$ $6 \times 1 \times x = 10 \times 4 \times 270$

$\Rightarrow x = \dfrac{(10 \times 4 \times 270)}{(6)}$

$\Rightarrow x = 1800.$

CHAIN RULE

A fort had provision of food for 150 men for 45 days. After 10 days, 25 men left the fort. The number of days for which the remaining food will last, is:

A. $29\frac{1}{5}$

B. $37\frac{1}{4}$

C. 42

D. 54

Answer: Option **C**

Explanation:

After 10 days : 150 men had food for 35 days.

Suppose 125 men had food for x days.

Now, *Less men, More days (Indirect Proportion)*

$\therefore$ 125 : 150 :: 35 : x $\Leftrightarrow$ 125 x x = 150 x 35

$\Rightarrow x = \frac{150 \times 35}{125}$

$\Rightarrow x = 42.$

CHAIN RULE

39 persons can repair a road in 12 days, working 5 hours a day. In how many days will 30 persons, working 6 hours a day, complete the work?

A. 10

B. 13

C. 14

D. 15

Answer: Option **B**

Explanation:

Let the required number of days be x.

Less persons, More days (Indirect Proportion)

More working hours per day, Less days (Indirect Proportion)

Persons 30 : 39
Working hours/day 6 : 5
} :: 12 : x

$\therefore$ $30 \times 6 \times x = 39 \times 5 \times 12$

$\Rightarrow x = \frac{(39 \times 5 \times 12)}{(30 \times 6)}$

$\Rightarrow x = 13.$

CHAIN RULE

If a quarter kg of potato costs 60 paise, how many paise will 200 gm cost?

A. 48 paise

B. 54 paise

C. 56 paise

D. 72 paise

Answer: Option **A**

Explanation:

Let the required weight be x kg.

Less weight, Less cost (Direct Proportion)

$\therefore$ 250 : 200 :: 60 : x $\Leftrightarrow$ 250 x x = (200 x 60)

$\Rightarrow x = \frac{(200 \times 60)}{250}$

$\Rightarrow x = 48.$

CHAIN RULE

In a dairy farm, 40 cows eat 40 bags of husk in 40 days. In how many days one cow will eat one bag of husk?

A. 1

B. $\frac{1}{40}$

C. 40

D. 80

Answer: Option **C**

Explanation:

Let the required number of days be x.

Less cows, More days (Indirect Proportion)

Less bags, Less days (Direct Proportion)

Cows 1 : 40
Bags 40 : 1
} :: 40 : x

$\therefore$ 1 x 40 x x = 40 x 1 x 40

$\Rightarrow$ x = 40.

CHAIN RULE

A wheel that has 6 cogs is meshed with a larger wheel of 14 cogs. When the smaller wheel has made 21 revolutions, then the number of revolutions mad by the larger wheel is:

A. 4

B. 9

C. 12

D. 49

Answer: Option **B**

Explanation:

Let the required number of revolutions made by larger wheel be x.

Then, *More cogs, Less revolutions (Indirect Proportion)*

$\therefore$ 14 : 6 :: 21 : x $\Leftrightarrow$ 14 x x = 6 x 21

$\Rightarrow x = \frac{6 \times 21}{14}$

$\Rightarrow x = 9.$

CHAIN RULE

. If 7 spiders make 7 webs in 7 days, then 1 spider will make 1 web in how many days?

A. 1

B. $\frac{7}{2}$

C. 7

D. 49

Answer: Option **C**

Explanation:

Let the required number days be x.

Less spiders, More days (Indirect Proportion)

Less webs, Less days (Direct Proportion)

Spiders 1 : 7
Webs 7 : 1
} :: 7 : x

$\therefore$ 1 x 7 x x = 7 x 1 x 7

$\Rightarrow x = 7$.

CHAIN RULE

A flagstaff 17.5 m high casts a shadow of length 40.25 m. The height of the building, which casts a shadow of length 28.75 m under similar conditions will be:

A. 10 m

B. 12.5 m

C. 17.5 m

D. 21.25 m

Answer: Option **B**

Explanation:

Let the height of the building x metres.

Less lengthy shadow, Less in the height (Direct Proportion)

$\therefore$ 40.25 : 28.75 :: 17.5 : x $\Leftrightarrow$ 40.25 x x = 28.75 x 17.5

$$x = \frac{28.75 \times 17.5}{40.25}$$

$\Rightarrow x = 12.5$

CHAIN RULE

In a camp, there is a meal for 120 men or 200 children. If 150 children have taken the meal, how many men will be catered to with remaining meal?

A. 20

B. 30

C. 40

D. 50

Answer: Option **B**

Explanation:

There is a meal for 200 children. 150 children have taken the meal.

Remaining meal is to be catered to 50 children.

Now, 200 children ≡ 120 men.

$$50 \text{ children} \equiv \left(\frac{120}{200} \times 50\right) = 30 \text{ men.}$$

CHAIN RULE

36 men can complete a piece of work in 18 days. In how many days will 27 men complete the same work?

A. 12

B. 18

C. 22

D. 24

E. None of these

Answer: Option **D**

Explanation:

Let the required number of days be x.

Less men, More days (Indirect Proportion)

$\therefore$ 27 : 36 :: 18 : x $\Leftrightarrow$ 27 x x = 36 x 18

$\Rightarrow x = \frac{36 \times 18}{27}$

$\Rightarrow x = 24.$

THANK YOU