AJ INSTITUTE OF ENGINEERING & TECHNOLOGY

DEPT. OF TRAINING & PLACEMENT

Test - 6

Chain rule, Logical problems

Wednesday 5th June 2024

1) 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

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

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

$\Rightarrow x = 12.$

2) 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 Ⓑ

Explanation:

Let the required number of bottles be x.

More machines, More bottles (Direct Proportion)

More minutes, More bottles (Direct Proportion)

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

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

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

$\Rightarrow x = 1800.$

3) 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 1/5

b) 37 ¼

c) 14

d) 15

Answer: Option Ⓒ

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)*

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

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

$\Rightarrow x = 42.$

4) 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 Ⓑ

Explanation:

Let the required number of days be x.

Less persons, More days (Indirect Proportion)

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

$$\left.\begin{matrix}\text{Persons} & 30 : 39 \\ \text{Working hours/day} & 6 : 5\end{matrix}\right\} :: 12 : x$$

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

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

$\Rightarrow x = 13.$

5) A man completes 5/8 of a job in 10 days. At this rate, how many more days will it takes him to finish the job?

a) 5

b) 6

c) 7

d) 7 ½

Answer: Option Ⓑ

Explanation:

$\text{Work done} = \dfrac{5}{8}$

$\text{Balance work} = \left(1 - \dfrac{5}{8}\right) = \dfrac{3}{8}$

Let the required number of days be x.

$\text{Then, } \dfrac{5}{8} : \dfrac{3}{8} :: 10 : x \quad \Leftrightarrow \quad \dfrac{5}{8} \times x = \dfrac{3}{8} \times 10$

$\Rightarrow x = \left(\dfrac{3}{8} \times 10 \times \dfrac{8}{5}\right)$

$\Rightarrow x = 6.$

6) 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 Ⓐ

Explanation:

Let the required weight be x kg.

Less weight, Less cost (Direct Proportion)

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

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

$\Rightarrow x$ = 48.

7) 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) 1/40

c) 40

d) 80

Answer: Option Ⓒ

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 × 40 x x = 40 × 1 × 40

$\Rightarrow x$ = 40.

8) 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)*

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

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

$\Rightarrow x = 9.$

9) 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)

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

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

$\Rightarrow x = 12.5$

10) 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 $\equiv$ 120 men.

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

11) An industrial loom weaves 0.128 metres of cloth every second. Approximately, how many seconds will it take for the loom to weave 25 metres of cloth?

a) 178

b) 195

c) 204

d) 488

Answer: Option (B)

Explanation:

Le the required time be x seconds.

More metres, More time (Direct Proportion)

$\therefore$ $0.128 : 25 :: 1 : x \quad \Leftrightarrow \quad 0.128x = 25 \times 1$

$$x = \frac{25}{0.128} = \frac{25 \times 1000}{128}$$

$\Rightarrow x = 195.31.$

$\therefore$ Required time = 195 sec (approximately).

12) 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

Answer: Option (D)

Explanation:

Let the required number of days be x.

Less men, More days (Indirect Proportion)

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

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

$\Rightarrow x = 24.$

13) 4 mat-weavers can weave 4 mats in 4 days. At the same rate, how many mats would be woven by 8 mat-weavers in 8 days?

a) 4

b) 8

c) 12

d) 16

Answer: Option ⓓ

Explanation:

Let the required number of bottles be x.

More weavers, More mats (Direct Proportion)

More days, More mats (Direct Proportion)

Wavers 4 : 8
Days 4 : 8
} :: 4 : x

$\therefore$ $4 \times 4 \times x = 8 \times 8 \times 4$

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

$\Rightarrow x = 16.$

14) If 15 men can reap the crops of a field in 28 days, in how many days will 5 men reap it?

a) 50 days
b) 60 days
c) 84 days
d) 9.333 days

Answer: C

Explanation:

Let 5 men can reap a field in x days

So, put the same quantities on the same side.

Men: Days

Now, Men and Days are inversely proportional to each other. If we increase the number of men fewer days will be required to complete the work.

Inversely proportional means $= 15 = \frac{1}{28}, 5 = \frac{1}{x}$

So, $\frac{5}{15} = \frac{28}{x}$

i.e., 5: 15 = 28: x

Or, x = (28*15)/ 5

Or, x = 84 days

Hence, 5 men can reap a field in 84 days.

15) If 16 men working 7 hours a day can plow a field in 48 days, in how many days will 14 men working 12 hours a day plow the same field?

a) 46
b) 32
c) 30
d) 35

Answer: B

Explanation:

Let the one-day work = number of men* total working hours per day
Now, the ratio of total work = (14*12): (16*7)
Now, the ratio of days = 48: x
Where x is the required number of days
Now, one day work is inversely proportional to the number of days:
So, (14*12): (16*7) = 48: x
Or, x = (48*16*7)/ (14*12) = 32
Therefore, 32 days are required to plow the same field.

16) Tanya is older than Eric.
Cliff is older than Tanya.
Eric is older than Cliff.
If the first two statements are true, the third statement is

a) true
b) false
c) uncertain

Answer: Option (B)

Explanation:

Because the first two statements are true, Eric is the youngest of the three, so the third statement must be false.

17) Blueberries cost more than strawberries.
Blueberries cost less than raspberries.
Raspberries cost more than strawberries and blueberries.
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓐ

Explanation:

Because the first two statements are true, raspberries are the most expensive of the three.

18) Mara runs faster than Gail.
Lily runs faster than Mara.
Gail runs faster than Lily.
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓑ

Explanation:

We know from the first two statements that Lily runs fastest. Therefore, the third statement must be false.

19) A fruit basket contains more apples than lemons.
There are more lemons in the basket than there are oranges.
The basket contains more apples than oranges.
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓐ

Explanation:

There are fewer oranges than either apples or lemons, so the statement is true.

Easy method: (Try this method to solve without any confusion)

1. A fruit basket contains more apples than lemons = App > Lem
2. There are more lemons in the basket than there are oranges = Lem > Org

Now, Combine the above two results: App > Lem > Org

3. The basket contains more apples than oranges (App > ... > Org) = Yes.

Therefore, the given 3rd statement is true.

20) Joe is younger than Kathy.
Mark was born after Joe.
Kathy is older than Mark.
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓐ

Explanation:

Joe is younger than Kathy and older than Mark, so Mark must be younger than Kathy.

21) On the day the Barton triplets are born,
Jenna weighs more than Jason.
Jason weighs less than Jasmine.
Of the three babies, Jasmine weighs the most.
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓒ

Explanation:

We only know that Jasmine weighs more than Jason. There is no way to tell whether Jasmine also weighs more than Jenna.

22) The temperature on Monday was lower than on Tuesday.
The temperature on Wednesday was lower than on Tuesday.
The temperature on Monday was higher than on Wednesday
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓒ

Explanation:

We know from the first two statements that Tuesday had the highest temperature, but we cannot know whether Monday's temperature was higher than Wednesday's

23) The hotel is two blocks east of the drugstore.
The market is one block west of the hotel.
The drugstore is west of the market.
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓐ

Explanation:

The market is one block west of the hotel. The drugstore is two blocks west of the hotel, so the drugstore is west of the market.

24) A toothpick is useful.
Useful things are valuable.
A toothpick is valuable.
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓐ

Explanation:

To the extent that a toothpick is useful, it has value.

25) Three pencils cost the same as two erasers.
Four erasers cost the same as one ruler.
Pencils are more expensive than rulers.
If the first two statements are true, the third statement is

a) true

b) false

c) uncertain

Answer: Option Ⓑ

Explanation:

Rulers are the most expensive item.

26) Four defensive football players are chasing the opposing wide receiver, who has the ball. Calvin is directly behind the ball carrier. Jenkins and Burton are side by side behind Calvin. Zeller is behind Jenkins and Burton. Calvin tries for the tackle but misses and falls. Burton trips. Which defensive player tackles the receiver?

a) Burton

b) Zeller

c) Jenkins

d) Calvin

Answer: Option Ⓒ

Explanation:

After all the switching was done, Jenkins was directly behind the receiver. Calvin and Burton had fallen. Zeller remained in the rear.

27) A four-person crew from Classic Colors is painting Mr. Field's house. Michael is painting the front of the house. Ross is in the alley behind the house painting the back. Jed is painting the window frames on the north side, Shawn is on the south. If Michael switches places with Jed, and Jed then switches places with Shawn, where is Shawn?

a) in the alley behind the house

b) on the north side of the house

c) in front of the house

d) on the south side of the house

Answer: Option Ⓒ

Explanation:

After all the switches were made, Shawn is in front of the house. Ross is in the alley behind the house,Michael is on the north side, and Jed is on the south.

28) Four people witnessed a mugging. Each gave a different description of the mugger. Which description is probably right?

a) He was average height, thin, and middle-aged.

b) He was tall, thin, and middle-aged.

c) He was tall, thin, and young.

d) He was tall, of average weight, and middle-aged.

Answer: Option (B)

Explanation:

Tall, thin, and middle-aged are the elements of the description repeated most often and are therefore the most likely to be accurate.

29) At the baseball game, Henry was sitting in seat 253. Marla was sitting to the right of Henry in seat 254. In the seat to the left of Henry was George. Inez was sitting to the left of George. Which seat is Inez sitting in?

a) 251

b) 254

c) 255

d) 256

Answer: Option (A)

Explanation:

If George is sitting at Henry's left, George's seat is 252. The next seat to the left, then, is 251.

30) Four friends in the sixth grade were sharing a pizza. They decided that the oldest friend would get the extra piece. Randy is two months older than Greg, who is three months younger than Ned. Kent is one month older than Greg. Who should get the extra piece of pizza?

a) Randy

b) Greg

c) Ned

d) Kent

Answer: Option (C)

Explanation:

If Randy is two months older than Greg, then Ned is three months older than Greg and one month older than Randy. Kent is younger than both Randy and Ned. Ned is the oldest.