1.A train running at the speed of 60 km/hr crosses a pole in 9 seconds. What is the length of the train?
120 metres 180 metres 324 metres 150 metres

Answer: Option
Explanation:

$$\text{Speed} = \left(60 \times \frac{5}{18}\right) \text{m/sec} = \left(\frac{50}{3}\right) \text{m/sec.}$$

Length of the train = (Speed x Time).

$$\therefore \text{ Length of the train} = \left(\frac{50}{3} \times 9\right) \text{m} = 150 \text{ m.}$$

2.A train 125 m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10 seconds. The speed of the train is:

45 km/hr 50 km/hr 54 km/hr 55 km/hr

Answer: Option
Explanation:

$$\text{Speed of the train relative to man} = \left(\frac{125}{10}\right) \text{m/sec}$$

$$= \left(\frac{25}{2}\right) \text{m/sec.}$$

$$= \left(\frac{25}{2} \times \frac{18}{5}\right) \text{km/hr}$$

= 45 km/hr.

Let the speed of the train be x km/hr. Then, relative speed = (x - 5) km/hr.
$\therefore$ x - 5 = 45 $\Rightarrow$ x = 50 km/hr.

3.The length of the bridge, which a train 130 metres long and travelling at 45 km/hr can cross in 30 seconds, is:

200 m 225 m 245 m 250 m

Answer: Option

Explanation:

$$\text{Speed} = \left(45 \times \frac{5}{18}\right) \text{m/sec} = \left(\frac{25}{2}\right) \text{m/sec.}$$

Time = 30 sec.

Let the length of bridge be x metres.

$$\text{Then, } \frac{130 + x}{30} = \frac{25}{2}$$

$\Rightarrow$ 2(130 + x) = 750

$\Rightarrow$ x = 245 m.

4.Two trains running in opposite directions cross a man standing on the platform in 27 seconds and 17 seconds respectively and they cross each other in 23 seconds. The ratio of their speeds is:

1 : 3 3 : 2 3 : 4

Answer: Option

Explanation:

Let the speeds of the two trains be x m/sec and y m/sec respectively.

Then, length of the first train = 27x metres,

and length of the second train = 17y metres.

$$\therefore \frac{27x + 17y}{x + y} = 23$$

$\Rightarrow$ 27x + 17y = 23x + 23y

$\Rightarrow$ 4x = 6y

$$\Rightarrow \frac{x}{y} = \frac{3}{2}.$$

5.A train passes a station platform in 36 seconds and a man standing on the platform in 20 seconds. If the speed of the train is 54 km/hr, what is the length of the platform?

120 m 240 m 300 m

Answer: Option

Explanation:

$$\text{Speed} = \left(54 \times \frac{5}{18}\right) \text{m/sec} = 15 \text{ m/sec.}$$

Length of the train = (15 x 20)m = 300 m.

Let the length of the platform be x metres.

$$\text{Then, } \frac{x + 300}{36} = 15$$

$\Rightarrow x + 300 = 540$

$\Rightarrow x = 240$ m

6.A train 240 m long passes a pole in 24 seconds. How long will it take to pass a platform 650 m long?
65 sec 89 sec 100 sec 150 sec
Answer: Option
Explanation:

$$\text{Speed} = \left(\frac{240}{24}\right) \text{m/sec} = 10 \text{ m/sec.}$$

$$\therefore \text{ Required time} = \left(\frac{240 + 650}{10}\right) \text{sec} = 89 \text{ sec.}$$

7.Two trains of equal length are running on parallel lines in the same direction at 46 km/hr and 36 km/hr. The faster train passes the slower train in 36 seconds. The length of each train is:

50 m 72 m 80 m 82 m

Answer: Option
Explanation:

Let the length of each train be x metres.

Then, distance covered = $2x$ metres.

Relative speed = (46 - 36) km/hr

$$= \left(10 \times \frac{5}{18}\right) \text{m/sec}$$

$= \left(\frac{25}{9}\right)$ m/sec

$\therefore \frac{2x}{36} = \frac{25}{9}$

$\Rightarrow 2x = 100$

$\Rightarrow x = 50.$

8.A train 360 m long is running at a speed of 45 km/hr. In what time will it pass a bridge 140 m long?

40 sec 42 sec 45 sec 48 sec

Answer: Option
Explanation:

Formula for converting from km/hr to m/s: X km/hr $= \left(X \times \frac{5}{18}\right)$ m/s.

Therefore, Speed $= \left(45 \times \frac{5}{18}\right)$ m/sec $= \frac{25}{2}$ m/sec.

Total distance to be covered = (360 + 140) m = 500 m.

Formula for finding Time $= \left(\frac{\text{Distance}}{\text{Speed}}\right)$

$\therefore$ Required time $= \left(\frac{500 \times 2}{25}\right)$ sec $= 40$ sec.

9.Two trains are moving in opposite directions @ 60 km/hr and 90 km/hr. Their lengths are 1.10 km and 0.9 km respectively. The time taken by the slower train to cross the faster train in seconds is:

36 45 48 49

Answer: Option
Explanation:

Relative speed = (60+ 90) km/hr

$= \left(150 \times \frac{5}{18}\right)$ m/sec

$= \left(\frac{125}{3}\right)$ m/sec.

Distance covered = (1.10 + 0.9) km = 2 km = 2000 m.

Required time $= \left(2000 \times \frac{3}{125}\right)$ sec = 48 sec.

10.A jogger running at 9 kmph alongside a railway track in 240 metres ahead of the engine of a 120 metres long train running at 45 kmph in the same direction. In how much time will the train pass the jogger?

3.6 sec 18 sec 36 sec 72 sec

Answer: Option
Explanation:

Speed of train relative to jogger = (45 - 9) km/hr = 36 km/hr.

$= \left(36 \times \frac{5}{18}\right)$ m/sec

= 10 m/sec.

Distance to be covered = (240 + 120) m = 360 m.

$\therefore$ Time taken $= \left(\frac{360}{10}\right)$ sec = 36 sec.

11.A 270 metres long train running at the speed of 120 kmph crosses another train running in opposite direction at the speed of 80 kmph in 9 seconds. What is the length of the other train?
230 m 240 m 260 m 320 m

None of these
Answer: Option
Explanation:

Relative speed = (120 + 80) km/hr

$= \left(200 \times \frac{5}{18}\right) \text{m/sec}$

$= \left(\frac{500}{9}\right) \text{m/sec.}$

Let the length of the other train be x metres.

Then, $\frac{x + 270}{9} = \frac{500}{9}$

$\Rightarrow x + 270 = 500$

$\Rightarrow x = 230.$

12.A goods train runs at the speed of 72 kmph and crosses a 250 m long platform in 26 seconds. What is the length of the goods train?

230 m 240 m 260 m 270 m

Answer: Option
Explanation:

Speed $= \left(72 \times \frac{5}{18}\right) \text{m/sec} = 20 \text{ m/sec.}$

Time = 26 sec.

Let the length of the train be x metres.

Then, $\frac{x + 250}{26} = 20$

$\Rightarrow x + 250 = 520$

$\Rightarrow x = 270.$

13.Two trains, each 100 m long, moving in opposite directions, cross each other in 8 seconds. If one is moving twice as fast the other, then the speed of the faster train is:

30 km/hr 45 km/hr 60 km/hr 75 km/hr

Answer: Option
Explanation:

Let the speed of the slower train be x m/sec.

Then, speed of the faster train = $2x$ m/sec.

Relative speed = (x + $2x$) m/sec = $3x$ m/sec.

$$\therefore \frac{(100 + 100)}{8} = 3x$$

$$\Rightarrow 24x = 200$$

$$\Rightarrow x = \frac{25}{3}.$$

$$\text{So, speed of the faster train} = \frac{50}{3} \text{ m/sec}$$

$$= \left(\frac{50}{3} \times \frac{18}{5}\right) \text{km/hr}$$

= 60 km/hr.

14.Two trains 140 m and 160 m long run at the speed of 60 km/hr and 40 km/hr respectively in opposite directions on parallel tracks. The time (in seconds) which they take to cross each other, is:

9 9.6 10 10.8

Answer: Option

Explanation:

$$\text{Relative speed} = (60 + 40) \text{ km/hr} = \left(100 \times \frac{5}{18}\right) \text{m/sec} = \left(\frac{250}{9}\right) \text{m/sec.}$$

Distance covered in crossing each other = (140 + 160) m = 300 m.

$$\text{Required time} = \left(300 \times \frac{9}{250}\right) \text{sec} = \frac{54}{5} \text{ sec} = 10.8 \text{ sec.}$$

15.A train 110 metres long is running with a speed of 60 kmph. In what time will it pass a man who is running at 6 kmph in the direction opposite to that in which the train is going?

5 sec 6 sec 7 sec 10 sec

Answer: Option

Explanation:

Speed of train relative to man = (60 + 6) km/hr = 66 km/hr.

=	$\left(66 \times \frac{5}{18}\right)$ m/sec
=	$\left(\frac{55}{3}\right)$ m/sec.
∴ Time taken to pass the man =	$\left(110 \times \frac{3}{55}\right)$ sec = 6 sec.

16 A train travelling at a speed of 75 mph enters a tunnel $3\frac{1}{2}$ miles long. The train is $\frac{1}{4}$ mile long. How long does it take for the train to pass through the tunnel from the moment the front enters to the moment the rear emerges?

2.5 min 3 min 3.2 min 3.5 min

Answer: Option

Explanation:

Total distance covered	= $\left(\frac{7}{2} + \frac{1}{4}\right)$ miles
	= $\frac{15}{4}$ miles.
∴ Time taken	= $\left(\frac{15}{4 \times 75}\right)$ hrs
	= $\frac{1}{20}$ hrs
	= $\left(\frac{1}{20} \times 60\right)$ min.
	= 3 min.

17.A train 800 metres long is running at a speed of 78 km/hr. If it crosses a tunnel in 1 minute, then the length of the tunnel (in meters) is:

130 360 500 540

Answer: Option
Explanation:

$$\text{Speed} = \left(78 \times \frac{5}{18}\right) \text{m/sec} = \left(\frac{65}{3}\right) \text{m/sec.}$$

Time = 1 minute = 60 seconds.

Let the length of the tunnel be x metres.

$$\text{Then, } \left(\frac{800 + x}{60}\right) = \frac{65}{3}$$

$\Rightarrow$ 3(800 + x) = 3900

$\Rightarrow$ x = 500.

18.A 300 metre long train crosses a platform in 39 seconds while it crosses a signal pole in 18 seconds. What is the length of the platform?

320 m 350 m 650 m Data inadequate

Answer: Option
Explanation:

$$\text{Speed} = \left(\frac{300}{18}\right) \text{m/sec} = \frac{50}{3} \text{m/sec.}$$

Let the length of the platform be x metres.

$$\text{Then, } \left(\frac{x + 300}{39}\right) = \frac{50}{3}$$

$\Rightarrow$ 3(x + 300) = 1950

$\Rightarrow$ x = 350 m.

19.A train speeds past a pole in 15 seconds and a platform 100 m long in 25 seconds. Its length is:

50 m 150 m 200 m Data inadequate

Answer: Option
Explanation:

Let the length of the train be x metres and its speed by y m/sec.

Then, $\frac{x}{y} = 15 \Rightarrow y = \frac{x}{15}$.

$\therefore \frac{x + 100}{25} = \frac{x}{15}$

$\Rightarrow 15(x + 100) = 25x$

$\Rightarrow 15x + 1500 = 25x$

$\Rightarrow 1500 = 10x$

$\Rightarrow x = 150$ m.

20.A train moves past a telegraph post and a bridge 264 m long in 8 seconds and 20 seconds respectively. What is the speed of the train?

69.5 km/hr 70 km/hr 79 km/hr 79.2 km/hr

Answer: Option
Explanation:

Let the length of the train be x metres and its speed by y m/sec.

Then, $\frac{x}{y} = 8 \Rightarrow x = 8y$

Now, $\frac{x + 264}{20} = y$

$\Rightarrow 8y + 264 = 20y$

$\Rightarrow y = 22$.

$\therefore$ Speed = 22 m/sec = $\left(22 \times \frac{18}{5}\right)$ km/hr = 79.2 km/hr.

21.How many seconds will a 500 metre long train take to cross a man walking with a speed of 3 km/hr in the direction of the moving train if the speed of the train is 63 km/hr?
25 30 40 45

Answer: Option
Explanation:

Speed of the train relative to man	= (63 - 3) km/hr
	= 60 km/hr

	$= \left(60 \times \frac{5}{18}\right)$ m/sec
	$= \left(\frac{50}{3}\right)$ m/sec.
∴ Time taken to pass the man	$= \left(500 \times \frac{3}{50}\right)$ sec
	= 30 sec.

22.Two goods train each 500 m long, are running in opposite directions on parallel tracks. Their speeds are 45 km/hr and 30 km/hr respectively. Find the time taken by the slower train to pass the driver of the faster one.

12 sec 24 sec 48 sec 60 sec

Answer: Option
Explanation:

Relative speed =	= (45 + 30) km/hr
	$= \left(75 \times \frac{5}{18}\right)$ m/sec
	$= \left(\frac{125}{6}\right)$ m/sec.

We have to find the time taken by the slower train to pass the DRIVER of the faster train and not the complete train.

So, distance covered = Length of the slower train.

Therefore, Distance covered = 500 m.

∴ Required time =	$\left(500 \times \frac{6}{125}\right)$	= 24 sec.

23.Two trains are running in opposite directions with the same speed. If the length of each train is 120 metres and they cross each other in 12 seconds, then the speed of each train (in km/hr) is:

10 18 36 72

Answer: Option
Explanation:

Let the speed of each train be x m/sec.

Then, relative speed of the two trains = $2x$ m/sec.

So, $2x = \frac{(120 + 120)}{12}$

$\Rightarrow 2x = 20$

$\Rightarrow x = 10.$

$\therefore$ Speed of each train = $10 \text{ m/sec} = \left(10 \times \frac{18}{5}\right) \text{ km/hr} = 36 \text{ km/hr}.$

24.Two trains of equal lengths take 10 seconds and 15 seconds respectively to cross a telegraph post. If the length of each train be 120 metres, in what time (in seconds) will they cross each other travelling in opposite direction?

10 12 15 20

Answer: Option
Explanation:

Speed of the first train = $\left(\frac{120}{10}\right)$ m/sec = 12 m/sec.

Speed of the second train = $\left(\frac{120}{15}\right)$ m/sec = 8 m/sec.

Relative speed = (12 + 8) = 20 m/sec.

$\therefore$ Required time = $\left[\frac{(120 + 120)}{20}\right]$ sec = 12 sec.

25.A train 108 m long moving at a speed of 50 km/hr crosses a train 112 m long coming from opposite direction in 6 seconds. The speed of the second train is:

Ans:

82 km/hr

Two trains are running at 40 km/hr and 20 km/hr respectively in the same direction. Fast train completely passes a man sitting in the slower train in 5 seconds. What is the length of the fast train?

23 m

23	$\frac{2}{9}$	m
27	$\frac{7}{9}$	m

29 m

Answer: Option

Explanation:

Relative speed = (40 - 20) km/hr =	$\left(20 \times \frac{5}{18}\right)$	m/sec =	$\left(\frac{50}{9}\right)$	m/sec.
$\therefore$ Length of faster train =	$\left(\frac{50}{9} \times 5\right)$	m =	$\frac{250}{9}$ m = $27\frac{7}{9}$	m.

27.A train overtakes two persons who are walking in the same direction in which the train is going, at the rate of 2 kmph and 4 kmph and passes them completely in 9 and 10 seconds respectively. The length of the train is:

45 m 50 m 54 m 72 m

Answer: Option

Explanation:

2 kmph =	$\left(2 \times \frac{5}{18}\right)$	m/sec =	$\frac{5}{9}$	m/sec.
4 kmph =	$\left(4 \times \frac{5}{18}\right)$	m/sec =	$\frac{10}{9}$	m/sec.

Let the length of the train be *x* metres and its speed by *y* m/sec.

Then, $\frac{x}{y - \frac{5}{9}} = 9$ and $\frac{x}{y - \frac{10}{9}} = 10$.

$\therefore$ $9y - 5 = x$ and $10(9y - 10) = 9x$

$\Rightarrow$ $9y - x = 5$ and $90y - 9x = 100$.

On solving, we get: $x = 50$.

$\therefore$ Length of the train is 50 m.

28.A train overtakes two persons walking along a railway track. The first one walks at 4.5 km/hr. The other one walks at 5.4 km/hr. The train needs 8.4 and 8.5 seconds respectively to overtake them. What is the speed of the train if both the persons are walking in the same direction as the train?

66 km/hr 72 km/hr 78 km/hr 81 km/hr

Answer: Option
Explanation:

4.5 km/hr = $\left(4.5 \times \frac{5}{18}\right)$ m/sec = $\frac{5}{4}$ m/sec = 1.25 m/sec, and

5.4 km/hr = $\left(5.4 \times \frac{5}{18}\right)$ m/sec = $\frac{3}{2}$ m/sec = 1.5 m/sec.

Let the speed of the train be x m/sec.

Then, $(x - 1.25) \times 8.4 = (x - 1.5) \times 8.5$

$\Rightarrow$ $8.4x - 10.5 = 8.5x - 12.75$

$\Rightarrow$ $0.1x = 2.25$

$\Rightarrow$ $x = 22.5$

$\therefore$ Speed of the train = $\left(22.5 \times \frac{18}{5}\right)$ km/hr = 81 km/hr.

29.A train travelling at 48 kmph completely crosses another train having half its length and travelling in opposite direction at 42 kmph, in 12 seconds. It also passes a railway platform in 45 seconds. The length of the platform is

400 m 450 m 560 m 600 m

Answer: Option
Explanation:

Let the length of the first train be x metres.

Then, the length of the second train is $\left(\frac{x}{2}\right)$ metres.

Relative speed = (48 + 42) kmph = $\left(90 \times \frac{5}{18}\right)$ m/sec = 25 m/sec.

$\therefore \frac{[x + (x/2)]}{25} = 12$ or $\frac{3x}{2} = 300$ or $x = 200$.

$\therefore$ Length of first train = 200 m.

Let the length of platform be y metres.

Speed of the first train = $\left(48 \times \frac{5}{18}\right)$ m/sec = $\frac{40}{3}$ m/sec.

$\therefore (200 + y) \times \frac{3}{40} = 45$

$\Rightarrow$ 600 + 3y = 1800

$\Rightarrow$ y = 400 m.

30.Two stations A and B are 110 km apart on a straight line. One train starts from A at 7 a.m. and travels towards B at 20 kmph. Another train starts from B at 8 a.m. and travels towards A at a speed of 25 kmph. At what time will they meet?

9 a.m. 10 a.m. 10.30 a.m. 11 a.m.

Answer: Option

Explanation:

Suppose they meet x hours after 7 a.m.

Distance covered by A in x hours = 20x km.

Distance covered by B in (x - 1) hours = 25(x - 1) km.

$\therefore$ 20x + 25(x - 1) = 110

$\Rightarrow$ 45x = 135

$\Rightarrow$ x = 3.

So, they meet at 10 a.m.

31.Two, trains, one from Howrah to Patna and the other from Patna to Howrah, start simultaneously. After they meet, the trains reach their destinations after 9 hours and 16 hours respectively. The ratio of their speeds is:
2 : 3 4 : 3 6 : 7 9 : 16

Answer: Option
Explanation:

Let us name the trains as A and B. Then,

(A's speed) : (B's speed) = b : a = 16 : 9 = 4 : 3.

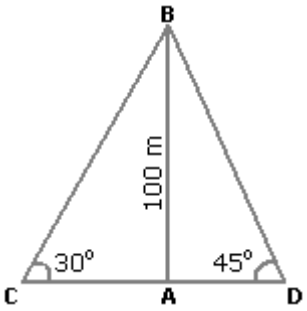
Aptitude :: Height and Distance

1.Two ships are sailing in the sea on the two sides of a lighthouse. The angle of elevation of the top of the lighthouse is observed from the ships are 30° and 45° respectively. If the lighthouse is 100 m high, the distance between the two ships is:

173 m 200 m 273 m 300 m

Answer: Option
Explanation:

Let AB be the lighthouse and C and D be the positions of the ships.



Then, AB = 100 m, $\angle ACB = 30°$ and $\angle ADB = 45°$.

$\frac{AB}{AC}$	$= \tan 30° = \frac{1}{3}$	$\Rightarrow$	$AC = AB \times 3 = 100\sqrt{3}$ m.
$\frac{AB}{AD}$	$= \tan 45° = 1$	$\Rightarrow$	$AD = AB = 100$ m.

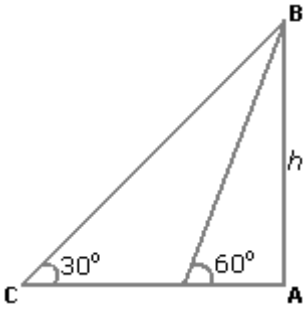
$\therefore$ CD = (AC + AD)	= (1003 + 100) m
	= 100(3 + 1)
	= (100 x 2.73) m
	= 273 m.

2.A man standing at a point P is watching the top of a tower, which makes an angle of elevation of 30° with the man's eye. The man walks some distance towards the tower to watch its top and the angle of the elevation becomes 60°. What is the distance between the base of the tower and the point P?

43 units 8 units 12 units Data inadequate None of these

Answer: Option
Explanation:

One of AB, AD and CD must have given.



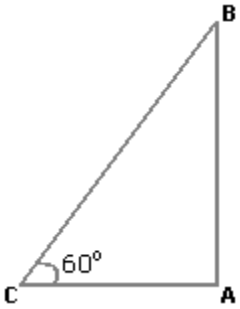
So, the data is inadequate.

3.The angle of elevation of a ladder leaning against a wall is 60° and the foot of the ladder is 4.6 m away from the wall. The length of the ladder is:

2.3 m 4.6 m 7.8 m 9.2 m

Answer: Option
Explanation:

Let AB be the wall and BC be the ladder.



Then, $\angle$ACB = 60° and AC = 4.6 m.

AC / BC	= cos 60° =	1 / 2

⇒ BC	= 2 x AC
	= (2 x 4.6) m
	= 9.2 m.

4.An observer 1.6 m tall is 203 away from a tower. The angle of elevation from his eye to the top of the tower is 30°. The height of the tower is:

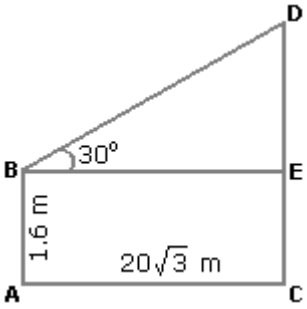
21.6 m

23.2 m

24.72 m

None of these
Answer: Option
Explanation:

Let AB be the observer and CD be the tower.



Draw BE ⊥ CD.

Then, CE = AB = 1.6 m,

BE = AC = 203 m.

DE / BE	= tan 30° =	1 / 3

⇒ DE =	203 / 3	m = 20 m.

∴ CD = CE + DE = (1.6 + 20) m = 21.6 m.

5.From a point P on a level ground, the angle of elevation of the top tower is 30°. If the tower is 100 m high, the distance of point P from the foot of the tower is:

149 m

156 m

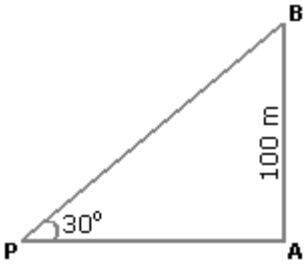
173 m

200 m

Answer: Option

Explanation:

Let AB be the tower.



Then, $\angle$APB = 30° and AB = 100 m.

AB / AP	= tan 30° =	1 / 3

$\Rightarrow$ AP	= (AB x 3) m
	= 1003 m
	= (100 x 1.73) m
	= 173 m.

6.The angle of elevation of the sun, when the length of the shadow of a tree 3 times the height of the tree, is:

30°

45°

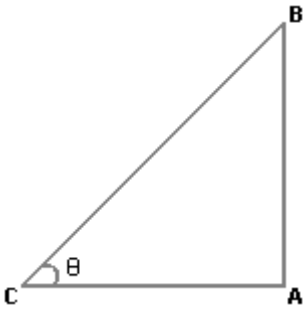
60°

90°

Answer: Option

Explanation:

Let AB be the tree and AC be its shadow.



Let $\angle ACB = \theta$.

Then,	$\frac{AC}{AB}$	=	3	$\Rightarrow$	$\cot\theta = 3$

$\therefore \theta = 30°$.

Aptitude :: Simple Interest

1.A sum of money at simple interest amounts to Rs. 815 in 3 years and to Rs. 854 in 4 years. The sum is:

Rs. 650 Rs. 690 Rs. 698 Rs. 700

Answer: Option
Explanation:

S.I. for 1 year = Rs. (854 - 815) = Rs. 39.

S.I. for 3 years = Rs.(39 x 3) = Rs. 117.

$\therefore$ Principal = Rs. (815 - 117) = Rs. 698.

2.Mr. Thomas invested an amount of Rs. 13,900 divided in two different schemes A and B at the simple interest rate of 14% p.a. and 11% p.a. respectively. If the total amount of simple interest earned in 2 years be Rs. 3508, what was the amount invested in Scheme B?

Rs. 6400 Rs. 6500 Rs. 7200 Rs. 7500 None of these

Answer: Option
Explanation:

Let the sum invested in Scheme A be Rs. x and that in Scheme B be Rs. (13900 - x).

Then,	$\frac{x \times 14 \times 2}{100}$	+	$\frac{(13900 - x) \times 11 \times 2}{100}$	= 3508

$\Rightarrow 28x - 22x = 350800 - (13900 \times 22)$

$\Rightarrow 6x = 45000$

$\Rightarrow x = 7500.$

So, sum invested in Scheme B = Rs. (13900 - 7500) = Rs. 6400.

3.A sum fetched a total simple interest of Rs. 4016.25 at the rate of 9 p.c.p.a. in 5 years. What is the sum?

Rs. 4462.50 Rs. 8032.50 Rs. 8900 Rs. 8925 None of these

Answer: Option
Explanation:

Principal	$= \text{Rs.} \left(\frac{100 \times 4016.25}{9 \times 5} \right)$
	$= \text{Rs.} \left(\frac{401625}{45} \right)$
	= Rs. 8925.

4.How much time will it take for an amount of Rs. 450 to yield Rs. 81 as interest at 4.5% per annum of simple interest?

3.5 years 4 years 4.5 years 5 years

Answer: Option
Explanation:

Time =	$\left(\frac{100 \times 81}{450 \times 4.5} \right)$	years	= 4 years.

5.Reena took a loan of Rs. 1200 with simple interest for as many years as the rate of interest. If she paid Rs. 432 as interest at the end of the loan period, what was the rate of interest?

3.6 6 18 Cannot be determined None of these

Answer: Option

Explanation:

Let rate = R% and time = R years.

Then, $\left(\frac{1200 \times R \times R}{100}\right) = 432$

$\Rightarrow 12R^2 = 432$

$\Rightarrow R^2 = 36$

$\Rightarrow R = 6.$

6.A sum of Rs. 12,500 amounts to Rs. 15,500 in 4 years at the rate of simple interest. What is the rate of interest?

3% 4% 5% 6%

None of these
Answer: Option
Explanation:

S.I. = Rs. (15500 - 12500) = Rs. 3000.

$\text{Rate} = \left(\frac{100 \times 3000}{12500 \times 4}\right)\% = 6\%$

7.An automobile financier claims to be lending money at simple interest, but he includes the interest every six months for calculating the principal. If he is charging an interest of 10%, the effective rate of interest becomes:

10% 10.25% 10.5% None of these

Answer: Option
Explanation:

Let the sum be Rs. 100. Then,

S.I. for first 6 months = Rs.	$\left(\frac{100 \times 10 \times 1}{100 \times 2}\right)$	= Rs. 5
S.I. for last 6 months = Rs.	$\left(\frac{105 \times 10 \times 1}{100 \times 2}\right)$	= Rs. 5.25

So, amount at the end of 1 year = Rs. (100 + 5 + 5.25) = Rs. 110.25

$\therefore$ Effective rate = (110.25 - 100) = 10.25%

8.A lent Rs. 5000 to B for 2 years and Rs. 3000 to C for 4 years on simple interest at the same rate of interest and received Rs. 2200 in all from both of them as interest. The rate of interest per annum is:

5% 7%

$7\frac{1}{8}\%$

10%

Answer: Option

Explanation:

Let the rate be R% p.a.

$$\text{Then, } \left(\frac{5000 \times R \times 2}{100}\right) + \left(\frac{3000 \times R \times 4}{100}\right) = 2200.$$

$\Rightarrow$ 100R + 120R = 2200

$$\Rightarrow R = \left(\frac{2200}{220}\right) = 10.$$

$\therefore$ Rate = 10%.

9.A sum of Rs. 725 is lent in the beginning of a year at a certain rate of interest. After 8 months, a sum of Rs. 362.50 more is lent but at the rate twice the former. At the end of the year, Rs. 33.50 is earned as interest from both the loans. What was the original rate of interest?

3.6% 4.5% 5% 6%

None of these

Answer: Option

Explanation:

Let the original rate be R%. Then, new rate = (2R)%.

Note:
Here, original rate is for 1 year(s); the new rate is for only 4 months i.e. $\frac{1}{3}$ year(s).

$$\therefore \left(\frac{725 \times R \times 1}{100}\right) + \left(\frac{362.50 \times 2R \times 1}{100 \times 3}\right) = 33.50$$

$\Rightarrow$ (2175 + 725) R = 33.50 x 100 x 3

$\Rightarrow$ (2175 + 725) R = 10050

$\Rightarrow$ (2900)R = 10050

$$\Rightarrow R = \frac{10050}{2900} = 3.46$$

$\therefore$ Original rate = 3.46%

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10. A man took loan from a bank at the rate of 12% p.a. simple interest. After 3 years he had to pay Rs. 5400 interest only for the period. The principal amount borrowed by him was:

Rs. 2000 Rs. 10,000 Rs. 15,000 Rs. 20,000

Answer: Option
Explanation:

$$\text{Principal} = \text{Rs.} \left(\frac{100 \times 5400}{12 \times 3}\right) = \text{Rs. } 15000.$$

11.A sum of money amounts to Rs. 9800 after 5 years and Rs. 12005 after 8 years at the same rate of simple interest. The rate of interest per annum is:

5% 8% 12% 15%

Answer: Option
Explanation:

S.I. for 3 years = Rs. (12005 - 9800) = Rs. 2205.

$$\text{S.I. for 5 years} = \text{Rs.} \left(\frac{2205}{3} \times 5\right) = \text{Rs. } 3675$$

$\therefore$ Principal = Rs. (9800 - 3675) = Rs. 6125.

$$\text{Hence, rate} = \left(\frac{100 \times 3675}{6125 \times 5}\right)\% = 12\%$$

12.What will be the ratio of simple interest earned by certain amount at the same rate of interest for 6 years and that for 9 years?

1 : 3 1 : 4 2 : 3 Data inadequate

None of these
Answer: Option
Explanation:

Let the principal be P and rate of interest be R%.

$$\therefore \text{ Required ratio} = \frac{\left(\frac{P \times R \times 6}{100}\right)}{\left(\frac{P \times R \times 9}{100}\right)} = \frac{6PR}{9PR} = \frac{6}{9} = 2 : 3.$$

13.A certain amount earns simple interest of Rs. 1750 after 7 years. Had the interest been 2% more, how much more interest would it have earned?

Rs. 35 Rs. 245 Rs. 350

Cannot be determined

None of these
Answer: Option
Explanation:

We need to know the S.I., principal and time to find the rate.

Since the principal is not given, so data is inadequate.

14.A person borrows Rs. 5000 for 2 years at 4% p.a. simple interest. He immediately lends it to another person at $6\frac{1}{4}\%$ p.a for 2 years. Find his gain in the transaction per year.

Rs. 112.50 Rs. 125 Rs. 225 Rs. 167.50

Answer: Option

Explanation:

Gain in 2 years	$= \text{Rs.} \left[5000 \times \frac{25}{4} \times \frac{2}{100} \right] - \left(\frac{5000 \times 4 \times 2}{100} \right)$
	$= \text{Rs.}\ (625 - 400)$
	$= \text{Rs.}\ 225.$
$\therefore$ Gain in 1 year = Rs. $\left(\frac{225}{2} \right)$	$= \text{Rs.}\ 112.50$

Profit and Loss - General Questions

1.Alfred buys an old scooter for Rs. 4700 and spends Rs. 800 on its repairs. If he sells the scooter for Rs. 5800, his gain percent is:

$4\frac{4}{7}\%$	
$5\frac{5}{11}\%$	

10%

12%

Answer: Option

Explanation:

Cost Price (C.P.) = Rs. (4700 + 800) = Rs. 5500.

Selling Price (S.P.) = Rs. 5800.

Gain = (S.P.) - (C.P.) = Rs.(5800 - 5500) = Rs. 300.

Gain % = $\left(\frac{300}{5500} \times 100 \right)\%$	$= 5\frac{5}{11}\%$

2.The cost price of 20 articles is the same as the selling price of *x* articles. If the profit is 25%, then the value of *x* is:

15 16 18 25

Answer: Option

Explanation:

Let C.P. of each article be Re. 1 C.P. of x articles = Rs. x.

S.P. of x articles = Rs. 20.

Profit = Rs. (20 - x).

$\therefore \left(\frac{20 - x}{x}\right) \times 100 = 25$

$\Rightarrow$ 2000 - 100x = 25x

125x = 2000

$\Rightarrow$ x = 16.

3.If selling price is doubled, the profit triples. Find the profit percent.

$66\frac{2}{3}$

100

$105\frac{1}{3}$

120

Answer: Option

Explanation:

Let C.P. be Rs. x and S.P. be Rs. y.

Then, 3(y - x) = (2y - x) $\Rightarrow$ y = 2x.

Profit = Rs. (y - x) = Rs. (2x - x) = Rs. x.

$\therefore$ Profit % = $\left(\frac{x}{x} \times 100\right)$ % = 100%

4.In a certain store, the profit is 320% of the cost. If the cost increases by 25% but the selling price remains constant, approximately what percentage of the selling price is the profit?

30% 70% 100% 250%

Answer: Option

Explanation:

Let C.P.= Rs. 100. Then, Profit = Rs. 320, S.P. = Rs. 420.

New C.P. = 125% of Rs. 100 = Rs. 125

New S.P. = Rs. 420.

Profit = Rs. (420 - 125) = Rs. 295.

$\therefore$ Required percentage = $\left(\frac{295}{420} \times 100\right)\%$ = $\frac{1475}{21}\%$ = 70% (approximately).

5.A vendor bought toffees at 6 for a rupee. How many for a rupee must he sell to gain 20%?

3 4 5 6

Answer: Option
Explanation:

C.P. of 6 toffees = Re. 1

S.P. of 6 toffees = 120% of Re. 1 = Rs. $\frac{6}{5}$

For Rs. $\frac{6}{5}$, toffees sold = 6.

For Re. 1, toffees sold = $\left(6 \times \frac{5}{6}\right)$ = 5.

6.The percentage profit earned by selling an article for Rs. 1920 is equal to the percentage loss incurred by selling the same article for Rs. 1280. At what price should the article be sold to make 25% profit?

Rs. 2000 Rs. 2200 Rs. 2400 Data inadequate

Explanation:

Let C.P. be Rs. x.

Then, $\frac{1920 - x}{x} \times 100 = \frac{x - 1280}{x} \times 100$

$\Rightarrow$ 1920 - x = x - 1280

$\Rightarrow$ 2x = 3200

$\Rightarrow x$ = 1600

$\therefore$ Required S.P. = 125% of Rs. 1600 = Rs. $\left(\frac{125}{100} \times 1600\right)$ = Rs 2000.

7.A shopkeeper expects a gain of 22.5% on his cost price. If in a week, his sale was of Rs. 392, what was his profit?

Rs. 18.20 Rs. 70 Rs. 72 Rs. 88.25

Answer: Option
Explanation:

$$\text{C.P.} = \text{Rs.} \left(\frac{100}{122.5} \times 392\right) = \text{Rs.} \left(\frac{1000}{1225} \times 392\right) = \text{Rs. } 320$$

$\therefore$ Profit = Rs. (392 - 320) = Rs. 72.

8.A man buys a cycle for Rs. 1400 and sells it at a loss of 15%. What is the selling price of the cycle?

Rs. 1090 Rs. 1160 Rs. 1190 Rs. 1202

Answer: Option
Explanation:

$$\text{S.P.} = 85\% \text{ of Rs. } 1400 = \text{Rs.} \left(\frac{85}{100} \times 1400\right) = \text{Rs. } 1190$$

Video Explanation: https://youtu.be/jn0XlafQvAc

9.Sam purchased 20 dozens of toys at the rate of Rs. 375 per dozen. He sold each one of them at the rate of Rs. 33. What was his percentage profit?

3.5 4.5 5.6 6.5

Answer: Option
Explanation:

$$\text{Cost Price of 1 toy} = \text{Rs.} \left(\frac{375}{12}\right) = \text{Rs. } 31.25$$

Selling Price of 1 toy = Rs. 33 So, Gain = Rs. (33 - 31.25) = Rs. 1.75

$$\therefore \text{ Profit \%} = \left(\frac{1.75}{31.25} \times 100\right)\% = \frac{28}{5}\% = 5.6\%$$

10.Some articles were bought at 6 articles for Rs. 5 and sold at 5 articles for Rs. 6. Gain percent is:

30%

$33\frac{1}{3}\%$

35%

44%

Answer: Option

Explanation:

Suppose, number of articles bought = L.C.M. of 6 and 5 = 30.

C.P. of 30 articles = Rs.	$\left(\frac{5}{6} \text{ x } 30\right)$ = Rs. 25.
S.P. of 30 articles = Rs.	$\left(\frac{6}{5} \text{ x } 30\right)$ = Rs. 36.
$\therefore$ Gain % =	$\left(\frac{11}{25} \text{ x } 100\right)$ % = 44%.