Book For

The Reserve Bank of India

RBI Assistance Math Sample Paper in English ($year)

(1) 10 women can complete a work in 7 days and 10 children take 14 days to complete the work. How many days will 5 women and 10 children take to complete the work?

[A] 3

[B] 5

[C] 7

[D] Cannot be determined

[E] None of these

Answer : [C]

Explanation:

1 woman's 1 day's work = $\frac{1}{70}$

1 child's 1 day's work = $\frac{1}{140}$

(5 women + 10 children)'s day's work = $\left(\frac{5}{70} + \frac{10}{140}\right) = \left(\frac{1}{14} + \frac{1}{14}\right) = \frac{1}{7}$

$\therefore$ 5 women and 10 children will complete the work in 7 days.

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(2) P can complete a work in 12 days working 8 hours a day. Q can complete the same work in 8 days working 10 hours a day. If both P and Q work together, working 8 hours a day, in how many days can they complete the work?

[A]
$5\frac{5}{11}$

[B]
$5\frac{6}{11}$

[C]
$6\frac{5}{11}$

[D]
$6\frac{6}{11}$

Answer : [A]

Explanation:

P can complete the work in (12 x 8) hrs. = 96 hrs.
Q can complete the work in (8 x 10) hrs. = 80 hrs.

$\therefore$ P's1 hour's work = $\frac{1}{96}$ and Q's 1 hour's work = $\frac{1}{80}$.

(P + Q)'s 1 hour's work = $\left(\frac{1}{96} + \frac{1}{80}\right) = \frac{11}{480}$.

So, both P and Q will finish the work in $\left(\frac{480}{11}\right)$ hrs.

$\therefore$ Number of days of 8 hours each = $\left(\frac{480}{11} \times \frac{1}{8}\right) = \frac{60}{11}$ days = $5\frac{5}{11}$ days.

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(3) A, B and C can complete a piece of work in 24, 6 and 12 days respectively. Working together, they will complete the same work in:

[A]
$\frac{1}{24}$ day

[B]
$\frac{7}{24}$ day

[C]
3

$3\frac{3}{7}$ days

[D] 4 days

Answer : [C]

Explanation:

Formula: If A can do a piece of work in n days, then A's 1 day's work = $\frac{1}{n}$.

(A + B + C)'s 1 day's work = $\left(\frac{1}{24} + \frac{1}{6} + \frac{1}{12}\right) = \frac{7}{24}$.

So, all the three together will complete the job in $\left(\frac{24}{7}\right)_{\text{days}} = 3\frac{3}{7}$ days.

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(4) A and B can do a piece of work in 30 days, while B and C can do the same work in 24 days and C and A in 20 days. They all work together for 10 days when B and C leave. How many days more will A take to finish the work?

[A] 18 days

[B] 24 days

[C] 30 days

[D] 36 days

Answer : [A]

Explanation:

2(A + B + C)'s 1 day's work = $\left(\frac{1}{30} + \frac{1}{24} + \frac{1}{20}\right) = \frac{15}{120} = \frac{1}{8}$.

Therefore, (A + B + C)'s 1 day's work = $\frac{1}{2 \times 8} = \frac{1}{16}$.

Work done by A, B, C in 10 days = $\frac{10}{16} = \frac{5}{8}$.

Remaining work = $\left(1 - \frac{5}{8}\right) = \frac{3}{8}$.

A's 1 day's work = $\left(\frac{1}{16} - \frac{1}{24}\right) = \frac{1}{48}$.

Now, $\frac{1}{48}$ work is done by A in 1 day.

So, $\frac{3}{8}$ work will be done by A in $\left(48 \times \frac{3}{8}\right)$ = 18 days.

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

[A] 3

[B] 4

[C] 5

[D] 6

Answer : [C]

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 = $6 \times \frac{5}{}$ = 5.

$\left(\frac{}{6}\right)$

(6) 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?

[A] 30%

[B] 70%

[C] 100%

[D] 250%

Answer : [B]

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).

(7) 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?

[A] Rs. 2000

[B] Rs. 2200

[C] Rs. 2400

[D] Data inadequate

Answer : [A]

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.

(8) A trader mixes 26 kg of rice at Rs. 20 per kg with 30 kg of rice of other variety at Rs. 36 per kg and sells the mixture at Rs. 30 per kg. His profit percent is:

[A] No profit, no loss

[B] 5%

[C] 8%

[D] 10%

[E] None of these

Answer : [B]

Explanation:
C.P. of 56 kg rice = Rs. (26 x 20 + 30 x 36) = Rs. (520 + 1080) = Rs. 1600.
S.P. of 56 kg rice = Rs. (56 x 30) = Rs. 1680.
$\therefore$ Gain = $\left(\frac{80}{1600} \times 100\right)\%$ = 5%.

(9) A hall is 15 m long and 12 m broad. If the sum of the areas of the floor and the ceiling is equal to the sum of the areas of four walls, the volume of the hall is:

[A] 720

[B] 900

[C] 1200

[D] 1800

Answer : [C]

Explanation:
$2(15 + 12) \times h = 2(15 \times 12)$
$\Rightarrow h = \frac{180}{27}m = \frac{20}{3}m.$

$\therefore$ Volume $= \left(15 \times 12 \times \frac{20}{3}\right)_{m^3} = 1200\ m^3.$

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(10) A hollow iron pipe is 21 cm long and its external diameter is 8 cm. If the thickness of the pipe is 1 cm and iron weighs 8 g/cm^3, then the weight of the pipe is:

[A] 3.6 kg

[B] 3.696 kg

[C] 36 kg

[D] 36.9 kg

Answer : [B]

Explanation:
External radius = 4 cm,
Internal radius = 3 cm.

Volume of iron $= \left(\frac{22}{7} \times [(4)^2 - (3)^2] \times 21\right)_{cm^3}$

$= \left(\frac{22}{7} \times 7 \times 1 \times 21\right)_{cm^3}$

$= 462\ cm^3.$

$\therefore$ Weight of iron = (462 x 8) gm = 3696 gm = 3.696 kg.

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(11) 50 men took a dip in a water tank 40 m long and 20 m broad on a religious day. If the average displacement of water by a man is 4 m^3, then the rise in the water level in the tank will be:

[A] 20 cm

[B] 25 cm

[C] 35 cm

[D] 50 cm

Answer : [B]

Explanation:
Total volume of water displaced = (4 x 50) m^3 = 200 m^3.

$\therefore$ Rise in water level $= \left(\frac{200}{40 \times 20}\right)_m$ 0.25 m = 25 cm.

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(12) What is the total surface area of a right circular cone of height 14 cm and base radius 7 cm?

[A] 344.35 cm^2

[B] 462 cm^2

[C] 498.35 cm^2

[D] None of these

Answer : [C]

Explanation:
h = 14 cm, r = 7 cm.
So, l = $(7)^2 + (14)^2$ = 245 = 7 5 cm.
∴ Total surface area = $\pi rl + \pi r^2$

$$= \left(\frac{22}{7} \times 7 \times 7\ \ 5 + \frac{22}{7} \times 7 \times 7\right) cm^2$$

$$= [154(\ \ 5 + 1)]\ cm^2$$

$$= (154 \times 3.236)\ cm^2$$

$$= 498.35\ cm^2.$$

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(13) 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:

[A] 149 m

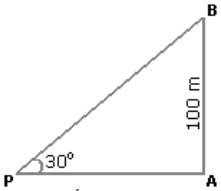
[B] 156 m

[C] 173 m

[D] 200 m

Answer : [C]

Explanation:
Let AB be the tower.



Then, ∠APB = 30? and AB = 100 m.

$$\frac{AB}{AP} = \tan 30? = \frac{1}{3}$$

⇒ AP = (AB x 3) m

= 100 3 m

= (100 x 1.73) m

= 173 m.

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(14) An observer 1.6 m tall is 20 3 away from a tower. The angle of elevation from his eye to the top of the tower is 30?. The heights of the tower is:

[A] 21.6 m

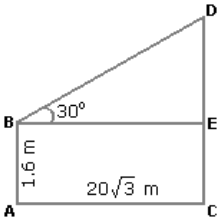
[B] 23.2 m

[C] 24.72 m

[D] None of these

Answer : [A]

Explanation:
Let AB be the observer and CD be the tower.



Draw BE ⊥ CD.
Then, CE = AB = 1.6 m,
BE = AC = 20 3 m.

$\frac{DE}{BE} = \tan 30^\circ = \frac{1}{3}$

$\Rightarrow DE = \frac{20\ 3}{3} m = 20$ m.

$\therefore$ CD = CE + DE = (1.6 + 20) m = 21.6 m.

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(15) 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:

[A] 173 m

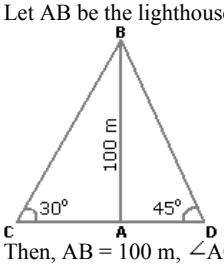
[B] 200 m

[C] 273 m

[D] 300 m

Answer : [C]

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



Then, AB = 100 m, ∠ACB = 30? and ∠ADB = 45?.

$\frac{AB}{AC} = \tan 30^\circ = \frac{1}{3} \Rightarrow$ AC = AB x 3 = 100 3 m.

$\frac{AB}{AD} = \tan 45^\circ = 1 \Rightarrow$ AD = AB = 100 m.

$\therefore$ CD = (AC + AD) = (100 3 + 100) m

= 100(3 + 1)

= (100 x 2.73) m

= 273 m.

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(16) If A = *x*% of *y* and B = *y*% of *x*, then which of the following is true?

[A] A is smaller than B.

[B] A is greater than B

[C] Relationship between A and B cannot be determined.

[D] If *x* is smaller than *y*, then A is greater than B.

[E] None of these

Answer : [E]

Explanation:

$x\%$ of $y = \left(\frac{x}{100} \times y\right) = \left(\frac{y}{100} \times x\right) = y\%$ of x

$\therefore$ A = B.

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(17) A batsman scored 110 runs which included 3 boundaries and 8 sixes. What percent of his total score did he make by running between the wickets?

[A] 45%

[B] $45\frac{5}{11}\%$

[C] $54\frac{6}{11}\%$

[D] 55%

Answer : [B]

Explanation:
Number of runs made by running = 110 - (3 x 4 + 8 x 6)
= 110 - (60)
= 50.
$\therefore$ Required percentage = $\left(\frac{50}{110} \times 100\right)\% = 45\frac{5}{11}\%$

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(18) If 20% of *a* = *b*, then *b*% of 20 is the same as:

[A] 4% of *a*

[B] 5% of *a*

[C] 20% of *a*

[D] None of these

Answer : [A]

Explanation:
20% of $a = b \Rightarrow \frac{20}{100}a = b$.

$\therefore$ $b\%$ of $20 = \left(\frac{b}{100} \times 20\right) = \left(\frac{20}{100}a \times \frac{1}{100} \times 20\right) = \frac{4}{100}a = 4\%$ of a.

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(19) Rajeev buys good worth Rs. 6650. He gets a rebate of 6% on it. After getting the rebate, he pays sales tax @ 10%. Find the amount he will have to pay for the goods.

[A] Rs. 6876.10

[B] Rs. 6999.20

[C] Rs. 6654

[D] Rs. 7000

Answer : [A]

Explanation:
Rebate = 6% of Rs. 6650 = Rs. $\left(\frac{6}{100} \times 6650\right)$ = Rs. 399.

Sales tax = 10% of Rs. (6650 - 399) = Rs. $\left(\frac{10}{100} \times 6251\right)$ = Rs. 625.10

$\therefore$ Final amount = Rs. (6251 + 625.10) = Rs. 6876.10

(20) The population of a town increased from 1,75,000 to 2,62,500 in a decade. The average percent increase of population per year is:

[A] 4.37%

[B] 5%

[C] 6%

[D] 8.75%

Answer : [B]

Explanation:
Increase in 10 years = (262500 - 175000) = 87500.

Increase% = $\left(\frac{87500}{175000} \times 100\right)\% = 50\%$.

$\therefore$ Required average = $\left(\frac{50}{10}\right)\% = 5\%$.