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(1) A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?

[A] 12 days

[B] 15 days

[C] 16 days

[D] 18 days

Answer : [B]

Explanation:

$$\text{A's 2 day's work} = \left(\frac{1}{20} \times 2\right) = \frac{1}{10}.$$

$$(\text{A} + \text{B} + \text{C})\text{'s 1 day's work} = \left(\frac{1}{20} + \frac{1}{30} + \frac{1}{60}\right) = \frac{6}{60} = \frac{1}{10}.$$

$$\text{Work done in 3 days} = \left(\frac{1}{10} + \frac{1}{10}\right) = \frac{1}{5}.$$

Now, $\frac{1}{5}$ work is done in 3 days.

\therefore Whole work will be done in $(3 \times 5) = 15$ days.

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(2) A can do a certain work in the same time in which B and C together can do it. If A and B together could do it in 10 days and C alone in 50 days, then B alone could do it in:

[A] 15 days

[B] 20 days

[C] 25 days

[D] 30 days

Answer : [C]

Explanation:

$$(\text{A} + \text{B})\text{'s 1 day's work} = \frac{1}{10}$$

$$\text{C's 1 day's work} = \frac{1}{50}$$

$$(\text{A} + \text{B} + \text{C})\text{'s 1 day's work} = \left(\frac{1}{10} + \frac{1}{50}\right) = \frac{6}{50} = \frac{3}{25} \dots (i)$$

$$\text{A's 1 day's work} = (\text{B} + \text{C})\text{'s 1 day's work} \dots (ii)$$

$$\text{From (i) and (ii), we get: } 2 \times (\text{A's 1 day's work}) = \frac{3}{25}$$

$$\Rightarrow \text{A's 1 day's work} = \frac{3}{50}$$

$$\therefore \text{B's 1 day's work} = \left(\frac{1}{10} - \frac{3}{50}\right) = \frac{2}{50} = \frac{1}{25}.$$

So, B alone could do the work in 25 days.

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(3) A machine P can print one lakh books in 8 hours, machine Q can print the same number of books in 10 hours while machine R can print them in 12 hours. All the machines are started at 9 A.M. while machine P is closed at 11 A.M. and the remaining two machines complete work. Approximately at what time will the work (to print one lakh books) be finished ?

[A] 11:30 A.M.

[B] 12 noon

[C] 12:30 P.M.

[D] 1:00 P.M.

Answer : [D]

Explanation:

$$(P + Q + R)\text{'s 1 hour's work} = \left(\frac{1}{8} + \frac{1}{10} + \frac{1}{12}\right) = \frac{37}{120}$$

$$\text{Work done by P, Q and R in 2 hours} = \left(\frac{37}{120} \times 2\right) = \frac{37}{60}$$

$$\text{Remaining work} = \left(1 - \frac{37}{60}\right) = \frac{23}{60}$$

$$(Q + R)\text{'s 1 hour's work} = \left(\frac{1}{10} + \frac{1}{12}\right) = \frac{11}{60}$$

Now, $\frac{11}{60}$ work is done by Q and R in 1 hour.

So, $\frac{23}{60}$ work will be done by Q and R in $\left(\frac{60}{11} \times \frac{23}{60}\right) = \frac{23}{11}$ hours ≈ 2 hours.

So, the work will be finished approximately 2 hours after 11 A.M., i.e., around 1 P.M.

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(4) A works twice as fast as B. If B can complete a work in 12 days independently, the number of days in which A and B can together finish the work in :

[A] 4 days

[B] 6 days

[C] 8 days

[D] 18 days

Answer : [A]

Explanation:

Ratio of rates of working of A and B = 2 : 1.

So, ratio of times taken = 1 : 2.

$$\text{B's 1 day's work} = \frac{1}{12}$$

\therefore A's 1 day's work = $\frac{1}{6}$; (2 times of B's work)

$$(A + B)\text{'s 1 day's work} = \left(\frac{1}{6} + \frac{1}{12}\right) = \frac{3}{12} = \frac{1}{4}$$

So, A and B together can finish the work in 4 days.

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(5) X can do a piece of work in 40 days. He works at it for 8 days and then Y finished it in 16 days. How long will they together take to complete the work?

[A]

$13\frac{1}{3}$ days

[B] 15 days

[C] 20 days

[D] 26 days

Answer : [A]

Explanation:

$$\text{Work done by X in 8 days} = \left(\frac{1}{40} \times 8\right) = \frac{1}{5}$$

$$\text{Remaining work} = \left(1 - \frac{1}{5}\right) = \frac{4}{5}$$

Now, $\frac{4}{5}$ work is done by Y in 16 days.

Whole work will be done by Y in $\left(16 \times \frac{5}{4}\right) = 20$ days.

\therefore X's 1 day's work = $\frac{1}{40}$, Y's 1 day's work = $\frac{1}{20}$.

(X + Y)'s 1 day's work = $\left(\frac{1}{40} + \frac{1}{20}\right) = \frac{3}{40}$.

Hence, X and Y will together complete the work in $\left(\frac{40}{3}\right) = 13\frac{1}{3}$ days.

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(6) 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 = $\left(6 \times \frac{5}{6}\right) = 5$.

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(7) If selling price is doubled, the profit triples. Find the profit percent.

[A]

$66\frac{2}{3}$

[B] 100

[C]

$105\frac{1}{3}$

[D] 120

Answer : [B]

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

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(8) 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:

[A]

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

[B]

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

[C] 10%

[D] 12%

Answer : [B]

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.

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

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(9) 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?

[A] Rs. 18.20

[B] Rs. 70

[C] Rs. 72

[D] Rs. 88.25

Answer : [C]

Explanation:

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

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

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(10) 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.

$$\therefore \text{Gain} = \left(\frac{80}{1600} \times 100 \right) \% = 5\%.$$

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(11) The difference between simple and compound interests compounded annually on a certain sum of money for 2 years at 4% per annum is Re. 1. The sum (in Rs.) is:

[A] 625

[B] 630

[C] 640

[D] 650

Answer : [A]

Explanation:

Let the sum be Rs. x . Then,

$$\text{C.I.} = \left[x \left(1 + \frac{4}{100} \right)^2 - x \right] = \left(\frac{676}{625}x - x \right) = \frac{51}{625}x.$$

$$\text{S.I.} = \left(\frac{x \times 4 \times 2}{100} \right) = \frac{2x}{25}$$

$$\therefore \frac{51x}{625} - \frac{2x}{25} = 1$$

$$\Rightarrow x = 625.$$

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(12) A bank offers 5% compound interest calculated on half-yearly basis. A customer deposits Rs. 1600 each on 1st January and 1st July of a year. At the end of the year, the amount he would have gained by way of interest is:

[A] Rs. 120

[B] Rs. 121

[C] Rs. 122

[D] Rs. 123

Answer : [B]

Explanation:

$$\begin{aligned} \text{Amount} &= \text{Rs.} \left[1600 \times \left(1 + \frac{5}{2 \times 100} \right)^2 + 1600 \times \left(1 + \frac{5}{2 \times 100} \right) \right] \\ &= \text{Rs.} \left[1600 \times \frac{41}{40} \times \frac{41}{40} + 1600 \times \frac{41}{40} \right] \\ &= \text{Rs.} \left[1600 \times \frac{41}{40} \left(\frac{41}{40} + 1 \right) \right] \\ &= \text{Rs.} \left[\frac{1600 \times 41 \times 81}{40 \times 40} \right] \\ &= \text{Rs.} 3321. \end{aligned}$$

$$\therefore \text{C.I.} = \text{Rs.} (3321 - 3200) = \text{Rs.} 121$$

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(13) Albert invested an amount of Rs. 8000 in a fixed deposit scheme for 2 years at compound interest rate 5 p.c.p.a. How much amount will Albert get on maturity of the fixed deposit?

[A] Rs. 8600

[B] Rs. 8620

[C] Rs. 8820

[D] None of these

Answer : [C]

Explanation:

$$\begin{aligned} \text{Amount} &= \text{Rs.} \left[8000 \times \left(1 + \frac{5}{100} \right)^2 \right] \\ &= \text{Rs.} \left(8000 \times \frac{21}{20} \times \frac{21}{20} \right) \\ &= \text{Rs.} 8820. \end{aligned}$$

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(14) At what rate of compound interest per annum will a sum of Rs. 1200 become Rs. 1348.32 in 2 years?

[A] 6%

[B] 6.5%

[C] 7%

[D] 7.5%

Answer : [A]

Explanation:

Let the rate be R% p.a.

$$\text{Then, } 1200 \times \left(1 + \frac{R}{100}\right)^2 = 1348.32$$

$$\Rightarrow \left(1 + \frac{R}{100}\right)^2 = \frac{134832}{120000} = \frac{11236}{10000}$$

$$\therefore \left(1 + \frac{R}{100}\right)^2 = \left(\frac{106}{100}\right)^2$$

$$\Rightarrow 1 + \frac{R}{100} = \frac{106}{100}$$

$$\Rightarrow R = 6\%$$

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(15) If the simple interest on a sum of money for 2 years at 5% per annum is Rs. 50, what is the compound interest on the same at the same rate and for the same time?

[A] Rs. 51.25

[B] Rs. 52

[C] Rs. 54.25

[D] Rs. 60

Answer : [A]

Explanation:

$$\text{Sum} = \text{Rs. } \left(\frac{50 \times 100}{2 \times 5}\right) = \text{Rs. } 500.$$

$$\text{Amount} = \text{Rs. } \left[500 \times \left(1 + \frac{5}{100}\right)^2\right]$$

$$= \text{Rs. } \left(500 \times \frac{21}{20} \times \frac{21}{20}\right)$$

$$= \text{Rs. } 551.25$$

$$\therefore \text{C.I.} = \text{Rs. } (551.25 - 500) = \text{Rs. } 51.25$$

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(16) A man has Rs. 480 in the denominations of one-rupee notes, five-rupee notes and ten-rupee notes. The number of notes of each denomination is equal. What is the total number of notes that he has ?

[A] 45

[B] 60

[C] 75

[D] 90

Answer : [D]

Explanation:

Let number of notes of each denomination be x .

$$\text{Then } x + 5x + 10x = 480$$

$$\Rightarrow 16x = 480$$

$$\therefore x = 30.$$

$$\text{Hence, total number of notes} = 3x = 90.$$

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(17) If $a - b = 3$ and $a^2 + b^2 = 29$, find the value of ab .

- [A] 10
 [B] 12
 [C] 15
 [D] 18

Answer : [A]

Explanation:

$$2ab = (a^2 + b^2) - (a - b)^2$$

$$= 29 - 9 = 20$$

$$\Rightarrow ab = 10.$$

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(18) There are two examinations rooms A and B. If 10 students are sent from A to B, then the number of students in each room is the same. If 20 candidates are sent from B to A, then the number of students in A is double the number of students in B. The number of students in room A is:

- [A] 20
 [B] 80
 [C] 100
 [D] 200

Answer : [C]

Explanation:

Let the number of students in rooms A and B be x and y respectively.

$$\text{Then, } x - 10 = y + 10 \Rightarrow x - y = 20 \dots (i)$$

$$\text{and } x + 20 = 2(y - 20) \Rightarrow x - 2y = -60 \dots (ii)$$

Solving (i) and (ii) we get: $x = 100$, $y = 80$.

\therefore The required answer A = 100.

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(19) To fill a tank, 25 buckets of water is required. How many buckets of water will be required to fill the same tank if the capacity of the bucket is reduced to two-fifth of its present ?

- [A] 10
 [B] 35
 [C] 62.5
 [D] Cannot be determined
 [E] None of these

Answer : [C]

Explanation:

Let the capacity of 1 bucket = x .

Then, the capacity of tank = $25x$.

$$\text{New capacity of bucket} = \frac{2}{5}x$$

$$\therefore \text{ Required number of buckets} = \frac{25x}{(2x/5)}$$

$$= \left(25x \times \frac{5}{2x} \right)$$

$$= \frac{125}{2}$$

$$= 62.5$$

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(20)

$$\frac{(469 + 174)^2 - (469 - 174)^2}{(469 \times 174)} = ?$$

- [A] 2

[B] 4

[C] 295

[D] 643

Answer : [B]

Explanation:

$$\text{Given exp.} = \frac{(a + b)^2 - (a - b)^2}{ab}$$

$$= \frac{4ab}{ab}$$

$$= 4 \text{ (where } a = 469, b = 174.)$$