Book For

Maharashtra State Road Transport Corporation (MSRTC)

MSRTC Junior Assistant Mathematics Sample Paper

(1) 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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(2) In an election between two candidates, one got 55% of the total valid votes, 20% of the votes were invalid. If the total number of votes was 7500, the number of valid votes that the other candidate got, was:

[A] 2700

[B] 2900

[C] 3000

[D] 3100

Answer : [A]

Explanation:

Number of valid votes = 80% of 7500 = 6000.

$\therefore$ Valid votes polled by other candidate = 45% of 6000

$= \left(\frac{45}{100} \times 6000\right) = 2700$.

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(3)

A student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$.

What is the percentage error in the calculation?

[A] 34%

[B] 44%

[C] 54%

[D] 64%

Answer : [D]

Explanation:

Let the number be x.

Then, error $= \frac{5}{3}x - \frac{3}{5}x = \frac{16}{15}x$.

Error% = $\left(\frac{16x}{15} \times \frac{3}{5x} \times 100\right)\%$ = 64%.

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(4) Two tailors X and Y are paid a total of Rs. 550 per week by their employer. If X is paid 120 percent of the sum paid to Y, how much is Y paid per week?

[A] Rs. 200

[B] Rs. 250

[C] Rs. 300

[D] None of these

Answer : [B]

Explanation:
Let the sum paid to Y per week be Rs. z.
Then, z + 120% of z = 550.
$\Rightarrow z + \frac{120}{100}z = 550$

$\Rightarrow \frac{11}{5}z = 550$

$\Rightarrow z = \left(\frac{550 \times 5}{11}\right) = 250.$

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(5) 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,
C.I. = $\left[x\left(1 + \frac{4}{100}\right)^2 - x\right] = \left(\frac{676}{625}x - x\right) = \frac{51}{625}x.$

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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(6) There is 60% increase in an amount in 6 years at simple interest. What will be the compound interest of Rs. 12,000 after 3 years at the same rate?

[A] Rs. 2160

[B] Rs. 3120

[C] Rs. 3972

[D] Rs. 6240

[E] None of these

Answer : [C]

Explanation:
Let P = Rs. 100. Then, S.I. Rs. 60 and T = 6 years.

$\therefore$ R = $\left(\frac{100 \times 60}{100 \times 6}\right)$ = 10% p.a.

Now, P = Rs. 12000. T = 3 years and R = 10% p.a.

$\therefore$ C.I. = Rs. $\left[12000 \times \left\{\left(1 + \frac{10}{100}\right)^3 - 1\right\}\right]$

= Rs. $\left(12000 \times \frac{331}{1000}\right)$

= 3972.

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(7) 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:

Amount = Rs. $\left[1600 \times \left(1 + \frac{5}{2 \times 100}\right)^2 + 1600 \times \left(1 + \frac{5}{2 \times 100}\right)\right]$

= Rs. $\left[1600 \times \frac{41}{40} \times \frac{41}{40} + 1600 \times \frac{41}{40}\right]$

= Rs. $\left[1600 \times \frac{41}{40}\left(\frac{41}{40} + 1\right)\right]$

= Rs. $\left[\frac{1600 \times 41 \times 81}{40 \times 40}\right]$

= Rs. 3321.

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

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(8) 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:

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

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

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

= Rs. 551.25

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

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(9) Simple interest on a certain sum of money for 3 years at 8% per annum is half the compound interest on Rs. 4000 for 2 years at 10% per annum. The sum placed on simple interest is:

[A] Rs. 1550

[B] Rs. 1650

[C] Rs. 1750

[D] Rs. 2000

Answer : [C]

Explanation:

C.I. = Rs. $\left[4000 \times \left(1 + \frac{10}{100}\right)^2 - 4000\right]$

= Rs. $\left(4000 \times \frac{11}{10} \times \frac{11}{10} - 4000\right)$

= Rs. 840.

$\therefore$ Sum = Rs. $\left(\frac{420 \times 100}{3 \times 8}\right)$ = Rs. 1750.

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(10) The price of commodity *X* increases by 40 paise every year, while the price of commodity *Y* increases by 15 paise every year. If in 2001, the price of commodity *X* was Rs. 4.20 and that of *Y* was Rs. 6.30, in which year commodity *X* will cost 40 paise more than the commodity *Y* ?

[A] 2010

[B] 2011

[C] 2012

[D] 2013

Answer : [B]

Explanation:

Suppose commodity X will cost 40 paise more than Y after z years.

Then, $(4.20 + 0.40z) - (6.30 + 0.15z) = 0.40$

$\Rightarrow 0.25z = 0.40 + 2.10$

$\Rightarrow z = \frac{2.50}{0.25} = \frac{250}{25} = 10.$

$\therefore$ X will cost 40 paise more than Y 10 years after 2001 *i.e.,* 2011.

(11) 617 + 6.017 + 0.617 + 6.0017 = ?

[A] 6.2963

[B] 62.965

[C] 629.6357

[D] None of these

Answer : [C]

Explanation:

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  617.00     6.017     0.617  +  6.0017   --------   629.6357   ---------
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(12) 34.95 + 240.016 + 23.98 = ?

[A] 298.0946

[B] 298.111

[C] 298.946

[D] 299.09

Answer : [C]

Explanation:

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   34.95   240.016  + 23.98  --------   298.946  --------
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(13) How many digits will be there to the right of the decimal point in the product of 95.75 and .02554 ?

[A] 5

[B] 6

[C] 7

[D] None of these

Answer : [B]

Explanation:
Sum of decimal places = 7.
Since the last digit to the extreme right will be zero (since 5 x 4 = 20), so there will be 6 significant digits to the right of the decimal point.

(14)

$$\frac{0.0203 \times 2.92}{0.0073 \times 14.5 \times 0.7} = ?$$

[A] 0.8

[B] 1.45

[C] 2.40

[D] 3.25

Answer : [A]

Explanation:

$$\frac{0.0203 \times 2.92}{0.0073 \times 14.5 \times 0.7} = \frac{203 \times 292}{73 \times 145 \times 7} = \frac{4}{5} = 0.8$$

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(15) A jar full of whisky contains 40% alcohol. A part of this whisky is replaced by another containing 19% alcohol and now the percentage of alcohol was found to be 26%. The quantity of whisky replaced is:

[A] $\frac{1}{3}$

[B] $\frac{2}{3}$

[C] $\frac{2}{5}$

[D] $\frac{3}{5}$

Answer : [B]

Explanation:

By the rule of alligation, we have:

Strength of first jar		Strength of 2nd jar
40%		19%
	Mean Strength 26%	
7		14

So, ratio of 1st and 2nd quantities = 7 : 14 = 1 : 2

$\therefore$ Required quantity replaced = $\frac{2}{3}$

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(16) A container contains 40 litres of milk. From this container 4 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

[A] 26.34 litres

[B] 27.36 litres

[C] 28 litres

[D] 29.16 litres

Answer : [D]

Explanation:

Amount of milk left after 3 operations = $\left[40\left(1 - \frac{4}{40}\right)^3\right]$ litres

$= \left(40 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10}\right) = 29.16$ litres.

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(17) The cost of Type 1 rice is Rs. 15 per kg and Type 2 rice is Rs. 20 per kg. If both Type 1 and Type 2 are mixed in the ratio of 2 : 3, then the price per kg of the mixed variety of rice is:

[A] Rs. 18

[B] Rs. 18.50

[C] Rs. 19

[D] Rs. 19.50

Answer : [A]

Explanation:
Let the price of the mixed variety be Rs. x per kg.
By rule of alligation, we have:

Cost of 1 kg of Type 1 rice		Cost of 1 kg of Type 2 rice
Rs. 15		Rs. 20
	Mean Price Rs. x	
$(20 - x)$		$(x - 15)$

$\therefore \frac{(20 - x)}{(x - 15)} = \frac{2}{3}$

$\Rightarrow 60 - 3x = 2x - 30$
$\Rightarrow 5x = 90$
$\Rightarrow x = 18.$

(18) Find the ratio in which rice at Rs. 7.20 a kg be mixed with rice at Rs. 5.70 a kg to produce a mixture worth Rs. 6.30 a kg.

[A] 1 : 3

[B] 2 : 3

[C] 3 : 4

[D] 4 : 5

Answer : [B]

Explanation:
By the rule of alligation:

Cost of 1 kg of 1st kind		Cost of 1 kg of 2nd kind
720 p		570 p
	Mean Price 630 p	
60		90

$\therefore$ Required ratio = 60 : 90 = 2 : 3.

(19) 8 litres are drawn from a cask full of wine and is then filled with water. This operation is performed three more times. The ratio of the quantity of wine now left in cask to that of water is 16 : 65. How much wine did the cask hold originally?

[A] 18 litres

[B] 24 litres

[C] 32 litres

[D] 42 litres

Answer : [B]

Explanation:
Let the quantity of the wine in the cask originally be x litres.
Then, quantity of wine left in cask after 4 operations = $\left[x\left(1 - \frac{8}{x}\right)^4\right]$ litres.

$\therefore \left(\frac{x(1 - (8/x))^4}{x}\right) = \frac{16}{81}$

$\Rightarrow \left(1 - \frac{8}{x}\right)^4 = \left(\frac{2}{3}\right)^4$

$\Rightarrow \left(\frac{x - 8}{x}\right) = \frac{2}{3}$

$\Rightarrow 3x - 24 = 2x$
$\Rightarrow x = 24.$

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(20) In what ratio must a grocer mix two varieties of tea worth Rs. 60 a kg and Rs. 65 a kg so that by selling the mixture at Rs. 68.20 a kg he may gain 10%?

[A] 3 : 2

[B] 3 : 4

[C] 3 : 5

[D] 4 : 5

Answer : [A]

Explanation:
S.P. of 1 kg of the mixture = Rs. 68.20, Gain = 10%.
C.P. of 1 kg of the mixture = Rs. $\left(\frac{100}{110} \times 68.20\right)$ = Rs. 62.

By the rule of alligation, we have:

Cost of 1 kg tea of 1st kind.		Cost of 1 kg tea of 2nd kind.
Rs. 60		Rs. 65
	Mean Price Rs. 62	
3		2

$\therefore$ Required ratio = 3 : 2.
