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The Question Bank

Mixed Math Questions for CGL Tier-1, CGL Tier-II, SSC 10+2

SSC Math's Quiz 09

Directions: Read the following questions carefully and choose the right answer.

1. The difference between the time taken by 2 cars to cover 450 Km is 1 hour 30 minutes. If the difference between their speeds is 15 Kmph, find the speed of the slower car?

A. 45 km/hr

B. 60 km/hr

C. 75 km/hr

D. 80 km/hr

2. There are 351 gold coins that are supposed to be divided among Abhay, Vishal and Kishore in the ratio 2 : 3 : 4 but by mistake it was divided in the ratio of 1/2 : 1/3 : 1/4. The number of extra/deficit gold coins incurred to Abhay due to this mistake is?

A. 45

B. 54

C. 56

D. 84

3. Lagaan is levied on the 40% of the total land in Village Sitapur. The revenue department collected total Rs. 4,48,800 through the lagaan from the village. Hari, a very rich farmer, paid only Rs. 580 as lagaan for his piece of land. The percentage of total land of Hari over the total taxable land of the village (appox) is:

A. 0.208%

B. 0.125%

C. 0.323%

D. 0.733%

4. A shopkeeper marked up the price of an item by 96% on the actual cost price and allows the discount of 25%. If he gave 2 items free on every dozen purchase, then find the profit percent on sale of 1 dozen items.

A. 35%

B. 36%

C. 25%

D. 26%

5. A can do a piece of work in 15 days, B can do the same work in 10 days, and C do the same work in 12 days. All three of them do the same work together, then they

collectively get Rs. 9000. If B's share is divided among three new persons D, E and F in the ratio of 1 : 5 : 3 respectively then find the share of F.

A. 1800

B. 2700

C. 1400

D. 1200

6. If x + y + z = 12 , then find the maximum value of (x − 1) (y − 2) (z − 3)

A. 4

B. 6

C. 8

D. 24

7. If $\cos^4 A - \sin^4 A = p$, then find the value of p.

A. $2 \cos^2 A - 1$

B. $2 \cos^2 A + 1$

C. $\cos^2 A - 1$

D. $\cos^2 A + 1$

8. A sum of money triples itself in 7 years. In how many years it amounts to 9 times of itself, if the interest is compounded annually?

A. 10 years 6 months

B. 14 years 6 months

C. 14 years

D. 21 years

9. The cost of 1 litre of milk is Rs. 20, what amount of water should be added to 1 litre of mixture to gain 25% profit, if the mixture is being sold at Rs. 20/litre?

A. 150 ml

B. 250 ml

C. 200 ml

D. 300 ml

10. Find the digits indicated by x & y in the number 353292xy if the number is completely divisible by 33.

A. x = 4, y = 5

B. x = 0, y = 6

C. x = 3, y = 6

D. x = 0, y = 9

Correct Answer:

1	2	3	4	5	6	7	8	9	10
B	D	C	D	D	C	A	C	C	B

Explanation

1. Let the speed of the slower car be x and the time taken to cover 450 km be T_1

    Then speed of car = x + 15 and time taken to cover 450 km be T_2

    Also time difference to cover 450 km by cars, i.e. $T_1 - T_2 = 1.5$ hours

    $$So, \frac{450}{x} - \frac{450}{x+15} = 1.5$$

    $$Or, \frac{300}{x} - \frac{300}{x+15} = 1$$

    Applying 'Hit and Trial' method, we get the putting x = 60 we get LHs = RHS.

    Therefore B is the correct Answer.

2. Abhay was supposed to get 2/9th of the total amount initially,

    But the division in the ratio of 1/2 : 1/3 : 1/4 = 6 : 4 : 3

    So, Abhay eventually got 6/13 of the total gold coins.

    $$So\ Abhay's\ gain\ = \left(\frac{6}{13} - \frac{2}{9}\right) \times 351 = 84$$

    Hence, option D is correct.

3. Let x be the total land

    Therefore taxable land = 40% of x = 0.4x

Rs. 448800 collected for 0.4x of land

$$Rs.\,1\,collected\,for\,\frac{0.4x}{448800}\,of\,land$$

As Hari paid Rs. 580 as Lagaan

$$Thus,\,taxable\,land\,of\,Hari\ =\ 580\times\frac{0.4x}{448800}$$

Since taxable land is only 40 % of total land.

$$Thus\,total\,land\,of\,Hari\ =\ \frac{100}{40}\times\frac{580\times0.4x}{448800}$$

Thus % of total land of hari over total taxable land of village

$$=\frac{\dfrac{100\times580\times0.4x}{40\times448800}}{0.4x}\times100\approx0.323$$

Hence, option C is correct.

4.   Let the CP be Rs. 100.

Here, we will use the concept of net effect on multiple discount and mark ups.

$$Net\,ratio\,of\,SP\,to\,CP\ =\frac{196}{100}\times\frac{3}{4}\times\frac{12}{14}=14\times9=126$$

$$Therefore,\,profit\,\%\ =\frac{126-100}{100}\times100=26\%$$

Hence, option D is correct.

5.   We know that money is distributed in the ratio of efficiency.

As ratio of time = 15 : 10 : 12

$$=\frac{1}{15}:\frac{1}{10}:\frac{1}{12}=4:6:5$$ Therefore, ratio of efficiency

Thus, B's share = $\dfrac{6}{15} \times 9000 = 3600$

Now, F's share = $\dfrac{3}{9} \times 3600 = 1200$

Hence, option D is correct.

6. We know that, average ≥ geometric mean,

Now, x + y + z = 12

$(x - 1) + (y - 2) + (z - 3) = 6$

Taking the arithmetic average, we get

$\dfrac{(x - 1) + (y - 2) + (z - 3)}{3} = \dfrac{6}{3} = 2$

⇒ arithmetic average = 2

Now the geometric mean = $\sqrt[3]{(x - 1)(y - 2)(z - 3)}$

Thus, $2 \geq \sqrt[3]{(x - 1)(y - 2)(z - 3)}$

Or, 8 ≥ (x − 1)(y − 2)(z − 3)

Therefore, maximum value of given expression is 8

Hence, option C is correct.

7. we know, $a^2 - b^2 = (a + b)(a - b)$

$\Rightarrow (\cos^2 A)^2 - (\sin^2 A)^2 = (\cos^2 A + \sin^2 A)(\cos^2 A - \sin^2 A)$

$\Rightarrow \{\cos^2 A - (1 - \cos^2 A)\}$ [using, $\sin^2 A + \cos^2 A = 1$]

$\Rightarrow 2\cos^2 A - 1$

Hence, option A is correct.

8. Let the rate of interest be R% and the time after which it becomes 9 times be t years.

Assume the principal be x

We have,

$$3x = x\left(1 + \frac{R}{100}\right)^7$$

$$(3)^{(1/7)} = \left(1 + \frac{R}{100}\right) \quad \text{.......eq. (i)}$$

Also, $9x = x\left(1 + \frac{R}{100}\right)^t$

$$(9)^{(1/t)} = \left(1 + \frac{R}{100}\right)$$

$$(3)^{(2/t)} = \left(1 + \frac{R}{100}\right) \quad \text{........eq. (ii)}$$

From eq(1) & eq(2), we get

$$(3)^{(1/7)} = (3)^{(2/t)}$$

or, $\dfrac{1}{7} = \dfrac{2}{t}$

or, t = 14 years.

Hence, option C is correct.

9. C.P of milk = Rs. 20

S.P of milk mixture = Rs. 20

Profit % = 25%

Thus, C.P of mixture = $\dfrac{4}{5} \times 20$ = Rs. 16

We can find amount of milk in mixture by mixture & allegations

Price of milk : Price of water

```
    20      0
      \   /
        16
      /   \
16 – 0     4
  16       4
```

$\dfrac{\text{ratio of water}}{\text{ratio of mixture}} = \dfrac{4}{16 + 4} = \dfrac{4}{20} = \dfrac{1}{5}$

Therefore, the amount of water in 1 kilolitre of mixture

$= \dfrac{1}{5} \times 1000 = 200$ ml

Hence, option C is correct.

10. We can solve this question applying hit and trial method.

Among the given options, only option B (0 and 6) satisfies the divisibility conditions for factors of 33 (3 and 11).

The given number:

353292xy

Putting the values, we get

35329206

The sum of all the digits is = 30 which is divisible by 3.

And

(Sum of the digits at even places) - (Sum of the digits at odd places) = 15 - 15 = 0

Clearly, the number is divisible by 11 as well.

Option B is hence the correct answer.