Mixed Maths Questions for SBI PO Pre, IBPS PO Pre, IBPS Clerk Mains, SBI Clerk Mains and LIC AAO Pre Exams.

Bank PO Maths Quiz 33

Direction: Study the following questions carefully and choose the right answer.

1. A number is drawn at random from first 100 natural numbers. What is the probability that the number is not a prime number?

A. $\frac{1}{2}$ B. $\frac{1}{4}$ C. $\frac{6}{25}$ D. $\frac{3}{4}$ E. None of these

2. When A and B work together then they take 4 hours to complete a piece of work. When B alone works at 75% of his efficiency then he takes 8 hours to complete half of the piece of work. Find the number of hours A alone will take to complete the piece of work if he works at 75% his efficiency?

A. 8 hours B. 6 hours C. 9 hours D. 4.5 hours E. None of these

3. A group of some boys met in a mango farm and pooled some mangoes in a bag such that each boy contributed exactly 4 mangoes more than the number of boys in the group. If each boy had contributed exactly 2 mangoes less than the number of boys in the group then the total number of mangoes would be 50% less than the first case. Find how many mangoes they would have pooled if each boy contributed exactly 2 mangoes more than the number of boys in the group?

A. 48 B. 24 C. 120 D. 80 E. None of these

4. The average monthly income of five earning members of a family was Rs. 12850. One member passes away then the employer started paying 25% of his monthly salary to the family. If the earning members of the family divided equally that money among themselves then after adding that amount with their monthly income, the average monthly income of remaining four members of the family become Rs. 9050. What was the share of each member?

A. Rs. 9350 B. Rs. 9680 C. Rs. 2337.50 D. Rs. 2420 E. None of these

5. A merchant fixes the selling price of an article Rs. 1260 after adding 20% profit on the cost price. As sales were very low at this price, he decided to issue a gift card free of cost to every customer which will give 10% cashback of total shopping amount. If the cost of each card was Rs. 10 then how much profit the merchant made on each article after giving 10% cashback and adding the cost of gift card on that cashback?

A. Rs. 94 B. Rs. 74 C. Rs. 84 D. Rs. 104 E. None of these

6. Two persons A, and B borrowed Rs. 4000 and Rs. 6000 respectively under simple interest from a bank. At the end of 8 years, each pay equal amount to the bank and the sum of their rate of interest per annum is 100, then what was the ratio of their rate of interest per annum?

A. 3 : 2 B. 2 : 1 C. 5 : 3 D. 5 : 4 E. None of these

7. Two persons A and B can complete a job in 60 days and 45 days respectively. The number of days taken by A and B together to complete the job is equal to the number of days taken by C alone to complete the same job. What percentage of work will be done if B and C had worked together for 10 days?

A. $61\frac{1}{9}\%$ B. $51\frac{1}{9}\%$ C. $61\frac{7}{9}\%$ D. $62\frac{2}{9}\%$ E. None of these

8. Two trains, A and B can cover a distance of 100 km and 150 km respectively in an equal time. If the length of train A in 500 meters and that of train B is 300 meters, then find the ratio of time taken by them to cross each other if they had travelled in opposite direction to the time taken by them if they had travelled in the same direction?

A. 5 : 1 B. 4 : 1 C. 1 : 4 D. 1 : 5 E. None of these

9. In an IBPS interview, there are some candidates (5 boys and x girls). If two candidates are to be selected randomly then the probability that both are girls is 16.67%. If the same number of candidates is to be selected randomly, then what is the probability that at least one is boy?

A. $\frac{5}{9}$ B. $\frac{5}{18}$ C. $\frac{4}{9}$ D. $\frac{13}{18}$ E. None of these

10. The price of petrol was increased by 20% therefore a person started travelling some distance by public transport to keep his monthly expenses and the total distance travelled every month unaltered. If the expenses of travelling by public transport is 33 1/3% of the expenses of travelling by own vehicle at the increased price of the petrol, then what percent of total journey did he travel by public transport?

A. 33.33% B. 25% C. 40% D. 30% E. None of these

Correct Answers:

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

Explanations:

1. The total number of prime numbers in the first 100 numbers = 25 [The prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97]

The total number of non-prime numbers in the first 100 numbers = 100 – 25 = 75

The reqd. probability = $\frac{75}{100} = \frac{3}{4}$

Hence, option D is correct.

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2. When B alone works at 75% of his efficiency then he takes 8 hours to complete half of the piece of work

Therefore, when B alone works at 75% of his efficiency then he takes

$\frac{8 \times 2}{1}$ = 16 hours to complete the piece of work

When B works at 100% of his efficiency then the number of hours he will take

$= 16 \times \frac{75}{100} = 16 \times \frac{3}{4} = 12$ hours

Let A take x hours to complete the piece of work then

$\frac{1}{x} + \frac{1}{12} = \frac{1}{4}$

$\frac{1}{x} = \frac{1}{4} - \frac{1}{12} = \frac{3-1}{12} = \frac{2}{12}$

x = 6 hours

When A works at 100% of his efficiency then he takes 6 hours

When he works at 75% of his efficiency then the number of hours he will take

$= 6 \times \frac{100}{75} = 6 \times \frac{4}{3} = 8$ hours

Hence, option A is correct.

3. Let the number of boys = n then each boy will contribute = n + 4 mangoes.

Total number of mangoes = n(n + 4) -------- (i)

Case II:
Each boy contribute 2 mangoes less than the number of boys in the group then the total collection of mangoes = n(n – 2) .....(i)

According t the question,

(100 – 50)% of n(n + 4) = n(n – 2)

50% of n(n + 4) = n(n – 2)

$n^2 + 4n = 2n^2 – 4n$

$n^2 = 8n$

n = 8

if each boy contributed exactly 2 mangoes more than the number of boys in the group then the total number of mangoes pooled = n (n + 2) = 8 (8 + 2) = 8 × 10 = 80

Hence, option D is correct.

4. The sum of the monthly income of five members of the family = Rs. 5 × 12850 = Rs. 64250

Let the monthly income of the person who passes away = Rs. 4x then the employer will pay 25% of 4x = Rs. x

After adding that amount with their monthly income, the average monthly income of remaining four members of the family become Rs. 9050

The sum = Rs. 9050 × 4 = Rs. 36200

If the employer had not given Rx. x, then their monthly income would have been 36200 – x = 64250 – 4x (the income of the remaining four members of the family)

3x = 64250 – 36200 = 28050

x = 9350

Now Rs. x i.e. Rs. 9350 they divide among themselves

Therefore, the share of each members $= \frac{9350}{4}$ = Rs. 2337.5

Hence, option C is correct.

5.

$$CP = \frac{SP \times 100}{100 + P} = \frac{1260 \times 100}{120} = \text{Rs. } 1050$$

SP after giving 10% cashback = (100 – 10)% of 1260 = 90% of 1260 = Rs. 1134

Now, the CP of a card = Rs. 10

The required profit = Rs. (1134 – 1050 – 10) = Rs. 74

Hence, option B is correct.

6.

We know that, $SI = \frac{P \times R \times T}{100}$

Let for A, Rate of interest per annum = a%

And for B, the rate of interest per annum = b%

Then, $4000 + 4000 \times a \times \frac{8}{100} = 6000 + 6000 \times b \times \frac{8}{100}$

$2000 = 40 \times 8a – 60 \times 8b$

$25 = 4a – 6b$ ----- (i)

From the question, $a + b = 100$ ----- (ii)

By solving both the equation,

$10a = 600 + 25 = 625$

$a = 62.5$

$b = 100 – 62.5 = 37.5$

The required ratio = 62.5 : 37.5 = 5 : 3

Hence, option C is correct.

7. Let A and B together will take x days then

$$\frac{1}{60}+\frac{1}{45}=\frac{1}{x}$$

$$\frac{3+4}{180}=\frac{1}{x}$$

X = number of days taken by C = number of days taken by A and B together

$$=\frac{180}{7}\text{ days}$$

When B and C work for 10 days then the total work done by them

$$=10\left(\frac{1}{45}+\frac{7}{180}\right)=10\times\frac{4+7}{180}$$

$$=10\times\frac{11}{180}=\frac{11}{18}\text{ th part of the work}$$

$$\text{The reqd. \%}=\frac{11\times100}{18}=\frac{11\times50}{9}$$

$$=\frac{550}{9}=61\frac{1}{9}\%$$

Hence, option A is correct.

8. Let time = x hours then

The speed of the train A = $\frac{100}{x}$ km per hour

The speed of the train B = $\frac{150}{x}$ km per hour

Let the time taken by them when they travel in opposite direction = t1 hours then

Relative speed = $\frac{100}{x}+\frac{150}{x}$ km per hour

$$=\left(\frac{100}{x}+\frac{150}{x}\right)\times\frac{5}{18}\text{ m/sec.}$$

We know that, t = distance/speed

$$t1 = \frac{500 + 300}{\left(\frac{100}{x} + \frac{150}{x}\right) \times \frac{5}{18}} = \frac{800 \times 18x}{250 \times 5}$$

Let the time taken by them when they travel in opposite direction = t2 hours then

Relative speed = $\frac{150}{x} - \frac{100}{x}$ km per hour

$= \left(\frac{150}{x} - \frac{100}{x}\right) \times \frac{5}{18}$ m/sec.

We know that, $t = \frac{\text{distance}}{\text{speed}}$

$$t2 = \frac{500 + 300}{\left(\frac{150}{x} - \frac{100}{x}\right) \times \frac{5}{18}} = \frac{800 \times 18x}{50 \times 5}$$

The reqd. ratio $= \frac{800 \times 18x}{250 \times 5} : \frac{800 \times 18x}{50 \times 5}$

$= \frac{1}{5} : \frac{1}{1} = 1 : 5$

Hence, option D is correct.

Alternative Solution:-

A and B can cover a distance of 100 km and 150 km respectively in an equal time.

So, Ratio of speed of A to speed of B = 2 : 3

Let the speed be 2x kmph and 3x kmph respectively

When they travel in opposite direction their relative speed = (2x + 3x) kmph = 5x kmph

When they travel in same direction their relative speed = (3x – 2x) kmph = x kmph

As they cross each other , the distance travelled will be same in either case.

So the time taken will be inversely proportional to the speed.

So, ratio of time taken by them to cross each other if they had travelled in opposite direction to the time taken by them if they had travelled in the same direction = x : 5x = 1 : 5

Hence, option D is correct.

9. Let the number of girls be x

The reqd. probability = $\frac{^{x}C_2}{^{5+x}C_2} = \frac{x \times (x-1)}{(5+x)(4+x)} = 16.67\% = \frac{1}{6}$

$(x^2 - x) \times 6 = x^2 + 9x + 20$

$5x^2 - 15x - 20 = 0$

By solving. x = 4 or –1

Negative value is not possible therefore, x = 4

P(at least one boy) = 1 – P(No boys at all/ both are girls)

$1 - \frac{^{4}C_2}{^{9}C_2} = 1 - \frac{3 \times 4}{9 \times 8} = 1 - \frac{1}{6} = \frac{5}{6}$

Hence, option E is correct.

Alternate solution:-

Two candidates are selected randomly then the probability that both are girls is 16.67% which is equivalent to 1/6.

So when two candidates are selected and at least one boy has to be there then the probability will be (1 – Probability both are girls) = (1 – 1/6) = 5/6

Hence option E is correct.

10. Let total distance = 100 km he travels every month

And the price of per litre petrol = Rs. 1

Then the monthly expenditure = Rs. 100 × 1 = Rs. 100

Now the price of the petrol increased by 20% then the new price of the petrol = 120% of 1 = Rs. 1.20

Now, 100/3% of 1.20 = Rs. 0.40 per km = expenses to travel by public transport

Let he travels x km by public transport then

$1.2 \times (100 - x) + 0.40 \times x = 100$

$120 - 1.2x + 0.40x = 100$

$20 = 1.2x - 0.40x = 0.8x$

$x = \frac{20}{0.8} = 25$

The reqd. % = $\frac{25 \times 100}{100} = 25\%$

Hence, option B is correct.