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GMAT

Quant Section Test

[PROBABILITY]

- Solutions

1. **Solution:**

Topic: Data Analysis

Concept Tested: Probability

Type of Question: Data Sufficiency (DS)

Given: There are 20 cards that have either a blue number or a purple number that is between 1 and 15 inclusive.

Question: Want is the probability that a card will either be blue or odd?

i.e. P(Blue or Odd) = ?

Approach: Since it is a question related to OR scenario, decide whether it is mutually exclusive or inclusive. Here, as there is overlapping between blue cards and Odd, it is mutually exclusive events. Hence, subtract the probability of intersection part as below.

$\Longrightarrow$Use, P(A orB)= P(A)+P(B)-P(A$\cap$B)

Statement I is insufficient:

Given: The probability that the card is blue and odd is 10%.

i.e. P (Blue $\cap$ Odd)= 10%=0.1

We know that,

P (Blue or Odd) = P (Blue) + P (Odd) - P (Blue $\cap$ Odd)

We cannot comment anything here as we do not know the values of P (Blue) and P (Odd).

Therefore, Statement I by itself is insufficient to answer the question asked.

So, eliminate A and D.

The answer is either B, C or E.

Statement II is insufficient:

Given: The probability that the card will be blue minus the probability that it will be odd is 20%.

i.e. P (Blue) – P (Odd) = 20% = $\frac{1}{5}$

There can be different values of P (Blue) and P (Odd) which yields 20% as the answer.

Therefore, Statement II by itself is insufficient to answer the question asked.

So, eliminate B.

The answer is either C or E.

Combine both Statements:

From statement 1: P (Blue ∩ Odd) = P (Blue) + P (Odd) – P (Blue & Odd) = 10% = 0.1

From statement 2: P (Blue) – P (Odd) = 20% = $\frac{1}{5}$

We cannot find P(Blue or Odd) using the above two relations.

Therefore, even after combining the two statements, it is insufficient to answer the question asked.

Hence, the answer is E.

2. **Solution:**

Topic: Data Analysis

Concept Tested: Probability

Type of Question: Data Sufficiency (DS)

Given: Let 'x' be the total # of pebbles. Hence we have $\frac{2x}{3}$ red pebbles & $\frac{x}{3}$ orange pebbles.

Question: How many orange pebbles are in the bag?

That means, we need to get the value of x to get $\frac{x}{3}$.

Statement I is sufficient:

Given: When two pebbles are drawn, the probability of both to be red = $\frac{5}{12}$

Hence, $\left[\frac{\left(\frac{2x}{3}\right)}{x} \times \frac{\left(\frac{2x}{3}\right)-1}{(x-1)}\right] = \frac{5}{12}$

We can solve this for x.

Therefore, Statement I by itself is sufficient to answer the question asked.

So, eliminate B,C and E.

The answer is either A or D.

Statement II is sufficient:

Given: An orange pebble is drawn & then another orange pebble is drawn, the probability of drawing a second orange pebble is $\frac{1}{4}$

Hence, $\frac{\left(\frac{x}{3}\right)-1}{(x-1)} = \frac{1}{4}$

We can solve this for x.

Therefore, Statement II by itself is sufficient to answer the question asked.

So, eliminate A.

Hence, the answer is D.

3. **Solution:**

Topic: Data Analysis

Concept Tested: Probability

Type of Question: Data Sufficiency (DS)

Given: Serena and Venus play a series of 5 tennis matches. Probability of Serena winning a match is 2/5. A winning candidate should win three games.

Question: The probability that Serena wins the series.

Statement I is insufficient:

Given: The series ends the moment when any of the two wins 3 matches.
P (Serena winning) = 2/5.

If Probability of draw is 3/5 and Venus winning is 0/5. We get different Probability of Serena winning the series.
If Probability of draw is 1/5 and Venus winning is 2/5. We get different Probability of Serena winning the series.
So, different answers possible depending on Probability of draw/Venus winning.

Therefore, Statement I by itself is insufficient to answer the question asked.

So, eliminate A and D.

The answer is either B, C or E.

Statement II is sufficient:

Given: The probability that Venus wins a game is 3/5.

From this statement it's clear that;

Probability of Venus losing a game = 1 – (Probability of Venus winning a game)

$= 1 - \frac{3}{5} = \frac{2}{5}$

Now this tells us that there is NO possibility of a DRAW as $\frac{2}{5} + \frac{3}{5} = 1$

We don't have to calculate since we know the information is sufficient.

Therefore, Statement II by itself is sufficient to answer the question asked.

So, eliminate C and E.

Hence, the answer is B.

4. **Solution:**

Topic: Data Analysis

Concept Tested: Probability

Type of Question: Problem Solving (PS)

Given: In a university of 30 professors, there are 17 female professors and 13 male professors.

Five professors are BEST professors, and three of these professors are female professors.

One professor is chosen at random.

Question: What is the probability of choosing a female professor or a BEST professor?

Approach: The best way to solve the question is as follows:

The probability of choosing a female professor or a Best professor is:

P(female professor or a Best professor) = P(female professor) + P(Best professor) - P(both female professor AND Best professor)

P(female professor or a Best professor) = $\frac{17}{30} + \frac{5}{30} - \frac{3}{30} = \frac{19}{30}$

Hence, the answer is B.

5. **Solution:**

Topic: Data Analysis

Concept Tested: Probability

Type of Question: Problem Solving (PS)

Given: Joy and Joe have 8 children.

P(girl) = $\frac{1}{2}$

P(boy) = $\frac{1}{2}$

Question: What is the P (exactly 4 girls) ?

Let's look at one scenario, when the couple will have exactly 4 girls = GGGGBBBB [If the first four are girls, then the remaining 4 have to be boys]

P (GGGGBBBB) = $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ [Having a boy or a girl are independent events]

Thus, P(exactly 4 girls) = $\left(\frac{1}{2}\right)^8 \times \#\, of\ re-arrangments\ of\ GGGGBBBB$

= $\left(\frac{1}{2}\right)^8 \times \frac{8!}{4!4!} = \left(\frac{1}{256}\right) \times \frac{8 \times 7 \times 6 \times 5 \times 4!}{4 \times 3 \times 2 \times 1 \times 4!} = \left(\frac{1}{128}\right)(35) = \frac{35}{128}$

Hence, the answer is C.

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