SOLUTIONS

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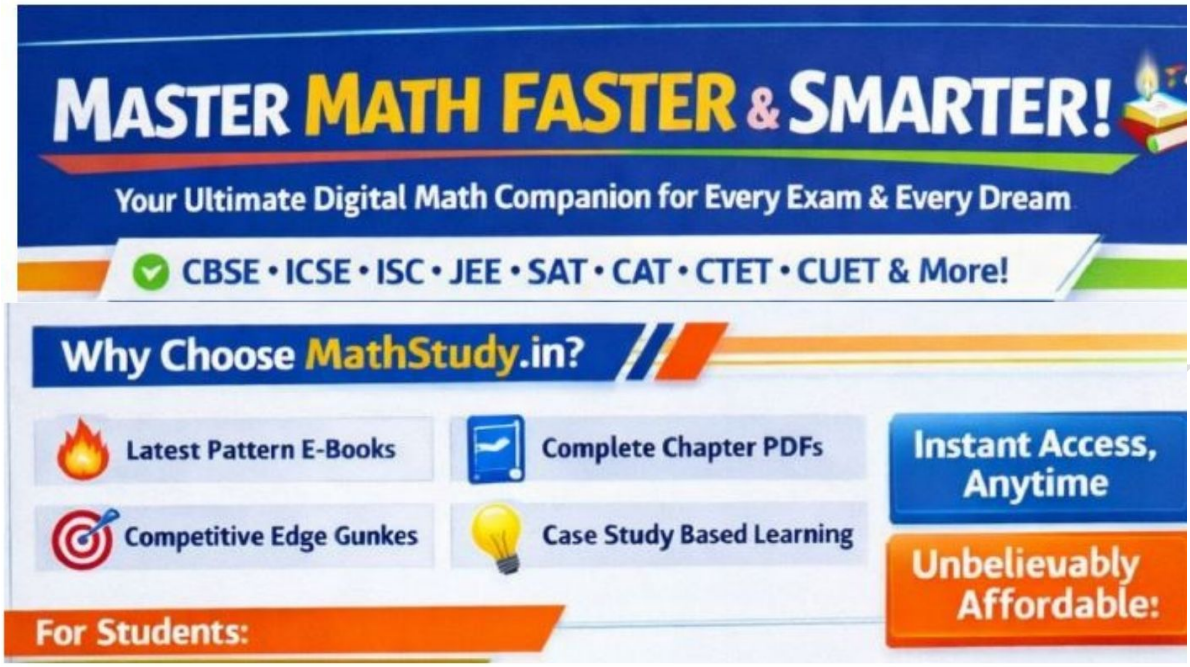

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SOLUTIONS: CHAPTER TEST PROBABILITY

Mathematics | Class IX | (2026/PROBAB/09/003)

Section A: Multiple Choice Questions (8 Marks)

1. **Answer: (a)** $\frac{1}{5}$
   Solution: Total cards = 25. Multiples of 5 are $\{5, 10, 15, 20, 25\}$, total = 5.
   $P(\text{Multiple of 5}) = \frac{5}{25} = \frac{1}{5}$.

2. **Answer: (a)** 0.526
   Solution: Total ladies = 300. Dislike coffee = 158.
   $P(\text{Dislike}) = \frac{158}{300} \approx 0.5266...$ which rounds to 0.526.

3. **Answer: (c)** $0 \leq P(A) \leq 1$
   Reasoning: By definition, probability is a measure that cannot be negative or exceed unity.

4. **Answer: (b)** 0.72
   Solution: $P(\text{No Head}) = \frac{56}{200} = 0.28$.
   $P(\text{At least one head}) = 1 - P(\text{No Head}) = 1 - 0.28 = 0.72$.

5. **Answer: (b)** 0
   Reasoning: An event that cannot happen has zero favorable outcomes.

6. **Answer: (b)** $\frac{1}{4}$
   Solution: Months starting with 'J': January, June, July (Total 3). Total months = 12.
   $P = \frac{3}{12} = \frac{1}{4}$.

7. **Answer: (b)** $\frac{1}{26}$
   Solution: Red kings are King of Hearts and King of Diamonds (Total 2). Total cards = 52.
   $P = \frac{2}{52} = \frac{1}{26}$.

8. **Answer: (b)** 0.97
   Solution: Defective = 15. Non-defective = $500 - 15 = 485$.
   $P(\text{Non-defective}) = \frac{485}{500} = \frac{97}{100} = 0.97$.

Section B: Very Short Answer Questions (8 Marks)

1. $P(\text{getting 3}) = \frac{\text{Frequency of 3}}{\text{Total trials}} = \frac{40}{250} = \frac{4}{25} = 0.16$.

2. $P(\text{Losing}) = 1 - P(\text{Winning}) = 1 - 0.62 = 0.38$.

3. Sample Space $S = \{\text{Saturday, Sunday}\}$. Size $n(S) = 2$.

4. Total marbles $= 5 + 8 + 4 = 17$. Green marbles = 4.
   $P(\text{Not green}) = \frac{17-4}{17} = \frac{13}{17}$.

Section C: Short Answer Questions (9 Marks)

1. Total days = 100. (i) Sold out before 3 PM includes "before noon" (15) and "12-3 PM" (35). Total = 50.
   $P = \frac{50}{100} = 0.5$.
   (ii) $P(\text{Not sold out}) = \frac{10}{100} = 0.1$.

2. (i) Total parts = 5. Not Green parts = 4 (Red, Blue, Yellow, Orange).
   $P(\text{Not Green}) = \frac{4}{5} = 0.8$.
   (ii) $P(\text{Red}) = \frac{22}{100} = 0.22$.

3. Total families = 1500. (i) $P(2 \text{ girls}) = \frac{475}{1500} = \frac{19}{60}$.
   (ii) At most 1 girl = (1 girl) or (0 girls) = $814 + 211 = 1025$.
   $P(\text{at most 1 girl}) = \frac{1025}{1500} = \frac{41}{60}$.

Section D: Long Answer Questions (10 Marks)

1. Total laptops (N) = 10,000.
   Screen Defects (S) = 200, Battery Issues (B) = 150, Both ($S \cap B$) = 50.

   (a) Screen only = $200 - 50 = 150$. $P = \frac{150}{10000} = 0.015$.
   (b) Battery only = $150 - 50 = 100$. $P = \frac{100}{10000} = 0.01$.
   (c) At least one = (Screen only + Battery only + Both) = $150 + 100 + 50 = 300$. $P = \frac{300}{10000} = 0.03$.
   (d) No defects = $10000 - 300 = 9700$. $P = \frac{9700}{10000} = 0.97$.

2. Area calculations:

   - Area of Square $ABCD = 20 \times 20 = 400$ cm^2.
   - Side of $PQRS$ (using Pythagoras on half-sides): $s = \sqrt{10^2 + 10^2} = \sqrt{200} = 10\sqrt{2}$ cm. Area $PQRS = (10\sqrt{2})^2 = 200$ cm^2.
   - Inscribed Circle: The diagram states $r = 5$ (Note: if inscribed in $PQRS$, the diameter is the side of $PQRS$ or the distance between midpoints. Here we use $r = 5$ as per the text).
     Area Circle = $\pi r^2 = 3.14 \times 25 = 78.5$ cm^2.

   (i) $P(\text{Shaded circle}) = \frac{\text{Area Circle}}{\text{Area ABCD}} = \frac{78.5}{400} = 0.19625$.
   (ii) Area between circle and PQRS = $200 - 78.5 = 121.5$ cm^2.
   $P = \frac{121.5}{400} = 0.30375$.

Case Study Solutions

1. **Answer: (b)** 0.60
   $P(\text{Scores}) = \frac{360}{600} = \frac{6}{10} = 0.60$.

2. **Answer: (b) 150**
   Wickets = Total deliveries - (Scored + Beaten) = $600 - (360 + 90) = 150$.

3. **Answer: (a)** 17/20
   Deliveries NOT beaten by pace = $600 - 90 = 510$.
   $P = \frac{510}{600} = \frac{51}{60} = \frac{17}{20}$.

4. **Answer: (d) 0.75**
   Success $= 360 + 90 = 450$. $P(\text{Success}) = \frac{450}{600} = \frac{3}{4} = 0.75$.

5. **Answer: (c) 30**
   $P(\text{Wicket}) = \frac{150}{600} = 0.25$. Expected wickets in 120 balls $= 0.25 \times 120 = 30$.