

CLASS 10

MATHS

EXTRA QUESTIONS

Class 10 Maths Chapter 14 Probability Extra Questions (HOTS)

Genuinely harder, HOTS-level practice for Class 10 Maths Chapter 14 (Probability), going beyond the textbook exercise with fresh scenarios and reverse-engineering problems.

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Q1 (Assertion-Reason). Assertion (A): $P(\text{sum}=13 \text{ on two dice})=0$. Reason (R): $P(\text{impossible event})=0$ always.

Solution: Max sum on two dice is $6+6=12$, so $\text{sum}=13$ is impossible, confirming A. R correctly states the general rule and explains A. **Answer: Both A and R true, R explains A.**

Q2 (Reverse-engineering). A bag has some red marbles and 18 green marbles. $P(\text{red})=2/5$. Find the number of red marbles and total marbles.

Solution: $r/(r+18)=2/5 \Rightarrow 5r=2r+36 \Rightarrow r=12$. Total=**30** (12 red, 18 green). Check: $12/30=2/5$ ✓

Q3 (Fresh scenario). Two dice thrown together. Find $P(\text{product of the two numbers is a perfect square})$.

Solution: Total=36. Products that are perfect squares (1,4,9,16,25,36): (1,1)=1 way; (1,4)(4,1)(2,2)=3 ways for 4; (3,3)=1 for 9; (4,4)=1 for 16; (5,5)=1 for 25; (6,6)=1 for 36. Total favourable=8. $P=8/36=2/9$.

Q4 (Fresh scenario). A card drawn from 52. Find $P(\text{neither a king nor a queen})$.

Solution: Exclude 4 kings+4 queens=8. Favourable=52-8=44. $P=44/52=11/13$.

Q5 (Fresh scenario). Four fair coins tossed together. Find $P(\text{exactly 2 heads})$, $P(\text{at least 3 heads})$, $P(\text{no head})$.

Solution: Total= $2^4=16$. Exactly 2 heads= ${}^4C_2=6 \Rightarrow 3/8$. At least 3= $4(\text{exactly 3})+1(\text{exactly 4})=5 \Rightarrow 5/16$. No head=1 (TTTT) $\Rightarrow 1/16$.

Q6 (Reverse-engineering with follow-up). A box has some red pens and 15 blue pens. $P(\text{red})=3/8$. Find red pens and total. If 5 more blue pens are added, find the new $P(\text{red})$.

Solution: $r/(r+15)=3/8 \Rightarrow 8r=3r+45 \Rightarrow r=9$. Total=**24** (9 red, 15 blue). After adding 5 blue: total=29, red unchanged=9. New $P(\text{red})=9/29$.

Q7 (Fresh scenario). Two dice thrown together. Find $P(\text{sum is a multiple of 4})$.

Solution: Multiples of 4 possible: 4,8,12. Sum4=3 ways, Sum8=5 ways, Sum12=1 way. Total favourable=9. $P=9/36=1/4$.

Q8 (Fresh scenario). A letter is chosen at random from the word MATHEMATICS. Find $P(\text{vowel})$, $P(\text{letter is M})$, $P(\text{consonant})$.

Solution: 11 letters: M=2, A=2, T=2, H=1, E=1, I=1, C=1, S=1. Vowels(A,E,I)=2+1+1=4 $\Rightarrow P(\text{vowel})=4/11$. $P(M)=2/11$. Consonants=11-4=7 $\Rightarrow P(\text{consonant})=7/11$.