2015 Q7

7. Each of two boxes contains three chips numbered 1, 2, 3. A chip is drawn randomly from each box and the numbers on the two chips are multiplied. What is the probability that their product is even?

(A) $\frac{1}{9}$ **(B)** $\frac{2}{9}$ **(C)** $\frac{4}{9}$ **(D)** $\frac{1}{2}$ **(E)** $\frac{5}{9}$

7. **Answer (E):** The nine possible equally likely outcomes are:

$$(1,1),(1,2),(1,3),(2,1),(2,2),(2,3),(3,1),(3,2),(3,3)$$

In five of the nine outcomes the product is even. Therefore the probability is $\frac{5}{9}$.

OR

The only way the product of the two values could be odd is if an odd number is drawn from each box. The probability that this occurs is $\frac{2}{3} \cdot \frac{2}{3} = \frac{4}{9}$. So the probability that the product is even is $1 - \frac{4}{9} = \frac{5}{9}$.

2013 Q8

8. A fair coin is tossed 3 times. What is the probability of at least two consecutive heads?

(A) $\frac{1}{8}$ **(B)** $\frac{1}{4}$ **(C)** $\frac{3}{8}$ **(D)** $\frac{1}{2}$ **(E)** $\frac{3}{4}$

8. **Answer (C):** List the 8 possible equally likely outcomes: HHH, HHT, HTH, HTT, THH, THT, TTH, TTT. Only HHH, HHT, THH have at least 2 consecutive heads, so the probability of at least 2 consecutive heads is $\frac{3}{8}$.

1999 Q10

10. A complete cycle of a traffic light takes 60 seconds. During each cycle the light is green for 25 seconds, yellow for 5 seconds, and red for 30 seconds. At a randomly chosen time, what is the probability that the light will NOT be green?

(A) $\frac{1}{4}$ **(B)** $\frac{1}{3}$ **(C)** $\frac{5}{12}$ **(D)** $\frac{1}{2}$ **(E)** $\frac{7}{12}$

10. **Answer (E):**

$$\frac{\text{time not green}}{\text{total time}} = \frac{\text{R} + \text{Y}}{\text{R} + \text{Y} + \text{G}} = \frac{35}{60} = \frac{7}{12}.$$

OR

The probability of green is $\frac{25}{60} = \frac{5}{12}$. so the probability of not green is $1 - \frac{5}{12} = \frac{7}{12}$.