

Introduction to Probability Part 2

Solution

6. $P(\text{hits the target}) = \frac{25}{\pi \times 10^2}$

$$\text{Expected number of times} = 50 \times \frac{25}{\pi \times 10^2} = \frac{25}{2\pi}$$

7. (a) $28 + x + 8 = 50$

$$\therefore x = 14$$

(b) Total frequency = 50

Frequency of landing on the side = 28

$$\text{Relative frequency of landing on the side} = \frac{28}{50} = \frac{14}{25}$$

$$\therefore \text{Experimental probability of landing on the side} = \frac{14}{25}$$

\therefore Experimental probability that the cup does not

$$\text{land on its side} = 1 - \frac{14}{25}$$

$$= \frac{11}{25}$$

10. $P(\text{even}) = \frac{3}{6} = \frac{1}{2}$

$$P(\text{odd}) = \frac{3}{6} = \frac{1}{2}$$

$$\therefore \text{Expected value of the prize} = \frac{1}{2} \times \$4 + \frac{1}{2} \times \$2$$

$$= \$3$$

11. The probability of winning \$100 000 = $\frac{1}{8000}$

$$\text{The probability of winning } \$20\,000 = \frac{1}{8000}$$

\therefore The expected value of the prize of each ticket

$$= \frac{1}{8000} \times \$100000 + \frac{1}{8000} \times \$20000 + \frac{7998}{8000} \times \$0$$

$$= \$12.5 + \$2.5$$

$$= \$15$$