

## PRACTICE PROBABILITY PROBLEMS

- If you draw a whole number from 1 to 10 at random, what are the odds:
  - in favor of getting a 7?
  - against getting a prime number?
  - against getting a number less than 9?
- A container holds 2 yellow marbles and 3 red marbles. A marble will be drawn, its color recorded and then replaced. A second marble will be drawn and its color recorded.
  - Draw the tree diagram.
  - On the diagram indicate the probability on each branch.
  - What is the probability of drawing 2 yellow marbles?
  - What is the probability of drawing at least 1 yellow?
- A card is drawn at random from a deck of 52 playing cards. What is the probability of drawing each of the following?
  - A red card.
  - Not a face card.
  - The queen of spades.
  - A seven or a black card.
- Counting numbers are to be formed using only digits from the set  $\{1, 2, 3, 4, 5\}$ . Determine the number of different possibilities for each type of number described.
  - two digit numbers.
  - odd three digit numbers.
  - four digit numbers with no repetitions allowed.
  - five digit numbers which must begin and end with a 2.
- In a proposed business venture, Stephanie estimates there is a 65% chance she will make \$70,000 and a 35% chance she will lose \$30,000. Determine Stephanie's expected value.
- A single card is drawn from a standard deck of cards. Find the following probabilities.
  - $P(\text{Jack} \mid \text{face card})$
  - $P(\text{face card} \mid \text{Jack})$
  - $P(\text{two} \mid \text{not face card})$
  - $P(\text{queen} \mid \text{black})$
- A local menu offers choices for 7 entrees, 4 varieties of potatoes, either salad or soup, 3 vegetables, and 5 beverages.
  - If you select an entree with potatoes, salad or soup, vegetable and beverage, how many different meals are possible?
  - How many of these meals have corn (one of the vegetable choices)?
  - What is the probability that a patron has a meal with corn?
  - What is the probability that a patron has a meal with baked potato (one of the potato choices), salad, and cola (one of the beverage choices)?
- For the experiment "toss a coin and spin a spinner with three equal sectors labeled A, B, and C."
  - List the sample space  $S$ .
  - List the event  $E$ , "toss a head and spin an A or B."
  - Find  $P(E)$ .
  - List  $\overline{E}$ .
  - Find  $P(\overline{E})$ .

## ANSWERS

1. (a) 1:9

(b) 6:4 (prime numbers are 2,3,5,7)

(c) 2:8

2. (a) For tree diagram see instructor

(b) For probability tree diagram see instructor

(c)  $P(YY) = \frac{2}{5} \cdot \frac{2}{5} = \frac{4}{25}$

(d)  $P(\text{at least one yellow}) = P(YY) + P(RY) + P(YR) = \frac{4}{25} + \frac{6}{25} + \frac{6}{25} = \frac{16}{25}$

3. (a)  $\frac{26}{52} = \frac{1}{2}$

(b)  $\frac{40}{52} = \frac{10}{13}$

(c)  $\frac{1}{52}$

(d)  $P(7) + P(\text{black}) - P(7 \cap \text{black}) = \frac{4}{52} + \frac{26}{52} - \frac{2}{52} = \frac{28}{52} = \frac{7}{13}$

4. (a)  $5 \cdot 5 = 25$

(b)  $5 \cdot 5 \cdot 3 = 75$

(c)  $5 \cdot 4 \cdot 3 \cdot 2 = 120$

(d)  $1 \cdot 5 \cdot 5 \cdot 5 \cdot 1 = 125$

5.  $.65(70,000) + .35(-30,000) = 35,000$

6. (a)  $\frac{P(J \cap \text{face})}{P(\text{face})} = \frac{4}{12} = \frac{1}{3}$

(b)  $\frac{P(J \cap \text{face})}{P(J)} = 1$

(c)  $\frac{P(2 \cap \text{not face})}{P(\text{not face})} = \frac{4}{40} = \frac{1}{10}$

(d)  $\frac{P(Q \cap \text{black})}{P(\text{black})} = \frac{2}{26} = \frac{1}{13}$

7. (a)  $7 \cdot 4 \cdot 2 \cdot 3 \cdot 5 = 840$

(b)  $7 \cdot 4 \cdot 2 \cdot 1 \cdot 5 = 280$

(c)  $\frac{280}{840} = \frac{1}{3}$

(d)  $7 \cdot 1 \cdot 1 \cdot 3 \cdot 1 =$  so the answer is  $\frac{21}{840} = \frac{1}{40}$

8. (a)  $S = \{HA, HB, HC, TA, TB, TC\}$

(b)  $E = \{HA, HB\}$

(c)  $P(E) = \frac{2}{6} = \frac{1}{3}$

(d)  $\overline{E} = \{HC, TA, TB, TC\}$

(e)  $P(\overline{E}) = \frac{4}{6} = \frac{2}{3}$