

Unit 5 Review

1. A bag contains 4 red and 6 white marbles.

a. How many ways can 5 marbles be selected if exactly 2 must be red?

$P(2 \text{ red } \& 3 \text{ white}) \quad 4C_2 \cdot 6C_3 = 120$

b. If two marbles are chosen at random, find  $P(2 \text{ white})$ .

$\frac{6}{10} \cdot \frac{5}{9} = \frac{30}{90} = \frac{1}{3}$

2. The probability that the Pirates will win a game against the Hornets is  $\frac{1}{4}$ . What are the odds that the Pirates will beat the Hornets?

$P(S) = \frac{1}{4}$   
 $P(F) = \frac{3}{4}$  Odds  $\frac{1/4}{3/4} = \frac{1}{3}$

3. Five cards are dealt from a standard deck of cards. What is the probability that they are all from the same suit?

$\frac{52}{52} \cdot \frac{12}{51} \cdot \frac{11}{50} \cdot \frac{10}{49} \cdot \frac{9}{48} = \frac{33}{16,660}$

can be any card →

4. Find the probability of getting a sum of 8 on the first throw of two number cubes and a sum of 4 on the second throw.

$P(\text{sum } 8 \cap \text{sum } 4) = \frac{5}{36} \cdot \frac{3}{36} = \frac{15}{1296} = \frac{5}{432}$

5. Callie is having a new phone line installed. What is the probability that the final 3 digits in the telephone number will all be odd?

$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$

6. A bag contains 3 red, 4 white, and 5 blue marbles. If 3 marbles are selected at random, what is the probability that all are red or all are blue?

$P(\text{all red}) = \frac{3C_3}{12C_3} = \frac{1}{220}$

$P(\text{all blue}) = \frac{5C_3}{12C_3} = \frac{10}{220} = \frac{1}{22}$

$P(\text{all red or all blue})$

$\frac{1}{220} + \frac{10}{220} = \frac{11}{220} = \frac{1}{20}$

7. A card is drawn from a standard deck of cards. What is the probability of selecting an ace or a black card?

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

8. Five bent coins are tossed. The probability of heads is  $\frac{2}{3}$  for each of them. What is the probability that no more than 2 coins will show heads?

$P(0H) + P(1H) + P(2H)$   
 $5C_5 \left(\frac{2}{3}\right)^0 \left(\frac{1}{3}\right)^5 + 5C_4 \left(\frac{2}{3}\right)^1 \left(\frac{1}{3}\right)^4 + 5C_3 \left(\frac{2}{3}\right)^2 \left(\frac{1}{3}\right)^3 = \frac{17}{81}$

9. While shooting arrows, Akira can hit the center of the target 4 out of 5 times. What is the probability that he will hit it exactly 4 out of the next 7 times?

$${}^7C_3 \left(\frac{4}{5}\right)^4 \left(\frac{1}{5}\right)^3 = .114688 = \frac{1,792}{15,625}$$

10. Players A and B play a game in which a die is rolled and A wins 2 points from B if a 5 or 6 appears. Otherwise, B wins 1 point from A. Decide if this a fair game.

5 or 6	1-4
2/6	4/6
+2	-1

$$4/6 - 4/6 = 0 \text{ fair game!}$$

11. Find the expected payoff using the table below:

Payoff	60	52	50
Probability	0.4	0.5	.1

$$60(.4) + 52(.5) + 50(.1)$$
$$24 + 26 + 5 = 55$$