

## 1.4 Independent and Dependent Events

Investigate Pg.28 #1-2

Keyword "**and**" means we multiply our probabilities together

**Independent Events:**

The occurrence of one event has NO effect on the occurrence of a second event.

**For independent events:  $P(A \text{ and } B) = P(A) * P(B)$**

What is the probability of flipping a head on a coin and rolling an odd number on a single die?

$$P(\text{Head}) \times P(\text{odd})$$

$$\frac{1}{2} \times \frac{3}{6} = \frac{3}{12} = \frac{1}{4}$$

What is the probability of rolling a 2 on four consecutive rolls of a single die?

$$\frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} = \frac{1}{1296}$$

$$\left(\frac{1}{6}\right)^4$$

a)  $\left(\frac{1}{3}\right)^4$       c)  $\left(\frac{1}{6}\right)^4$

b)  $\left(\frac{1}{2}\right)^4$       d)  $\left(\frac{1}{5}\right)^4$

**Dependent Events:**

The outcome of the first event DOES effect the outcome of the second event.

Ex. Choosing 2 cards from a deck and not replacing the first card.

What is the probability of selecting a King and an 8 from a single deck of cards without replacement?

$$P(\text{King}) \text{ and } P(8)$$
$$\frac{4}{52} \times \frac{4}{51} = \frac{16}{2652}$$
$$= \frac{4}{663}$$

A quiz is made up of 5 multiple-choice questions, each with 4 possible answers. Determine the probability that you will get at least 1 answer correct if you guess the answers to all 5 questions.

$$\left(\frac{3}{4}\right)^5 = \frac{243}{1024} \quad \text{all 5 wrong}$$

At least 1 correct

$$\frac{781}{1024}$$

**Test for Independence:**

Every year 42% of students catch the flu. Every year 21% of students get the flu shot. 10% of those that get the shot catch the flu. Are getting a flu shot and getting the flu independent?

$$P(\text{shot and flu}) = 0.1$$

$$P(\text{shot}) \times P(\text{flu})$$

$$0.21 \times 0.42$$

$$0.0882$$

Since our answers do not match the events are dependent.

**Assignment:**

**Pg. 31**

**2-8**