Unit 3 - Probability

3.1-3.2: Probability and Odds

The <u>probability</u> of an event compares the favourable outcomes to the total possible outcomes. This represents a part:whole comparison.

Probability is normally expressed as a fraction in lowest terms, however, it can also be expressed as a percent, decimal or in words.

Probability = <u>   favorable outcomes   </u>

                      total possible outcomes

(1) What is the probability of picking a king from a deck of cards?

$$P = \frac{4}{52} = \frac{1}{13} \qquad 0.08 \qquad 8\%$$

(2) What is the probability of getting tails in one toss of a coin?

$$P = \frac{1}{2} \qquad 0.5 \qquad 50\%$$

What is the difference between <u>probability</u> and <u>odds?</u>

The <u>odds in favour</u> is the ratio of favourable outcomes to unfavourable outcomes.

Odds in Favour =   n(A) : n(A')
[fav : unfav]

The <u>odds against</u> is the ratio of unfavourable outcomes to favourable outcomes

Odds Against =   n(A') : n(A)
[unfav : fav]

*NOTE: The odds against are the reciprocal of the odds in favour!

The odds are always expressed as a ratio in lowest terms (Part:Part).

<u>Example: (Page 148 - #3)</u>

Lily draws a card at random from a standard deck of 52 cards.
a) Determine the <u>probability</u> of the card being red.

$$P = \frac{26}{52} = \frac{1}{2}$$

b) Determine the <u>odds in favour</u> of the card being red.

$26 : 26$ = total possibilities

$1 : 1$

c) Determine the <u>odds against</u> the card being a spade.

$39 : 13$

$3 : 1$

d) Determine the <u>probability</u> of the card being a face card. (J, Q, K)

↓12

$$P = \frac{12}{52} = \frac{3}{13}$$

Example: (#11 on page 149)

A survey in a Western Canadian city determined that the odds in favour of a person between 18 and 35 using a social networking site are 31:19. Determine the probability of a randomly selected person between 18 and 35 using a social networking site.

$$P = \frac{31}{31+19} = \frac{31}{50} \qquad 62\% \qquad 0.62$$

Practice (pages 148 - 149)

#s 1, 2, 5, 7, 9, 12, 14