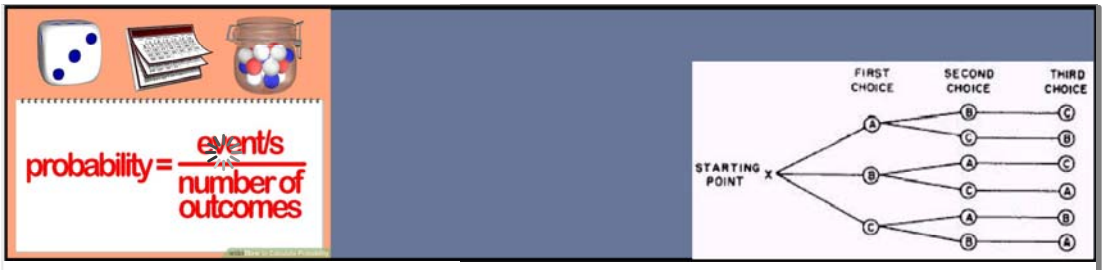

5.6 Exploring Probability

Definitions

Odds: wins : losses → ratio

Probability: $\frac{\#\text{outcomes}}{\text{total}} \times 100 \rightarrow \%$

Ex.) 200 : 1 odds Vegas wins the Cup

$\frac{26}{52} \times 100 = 50\%$ chance of red card

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Ex.) Use these numbers to answer the following questions.

{~~1~~, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20}

neither prime nor composite

a) What is the probability of picking a prime number?

$\frac{8}{20} \times 100 = 40\%$

b) What is the probability of pulling out a number divisible by 3?

$\frac{6}{20} \times 100 = 30\%$

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c) What are the odds in favor of getting an even number?

even : odd

10 : 10

$\frac{10}{10}$

1 : 1

d) What are the odds against of getting a number divisible by 5?

not divisible by 5 : divisible by 5

16 : 4

4 : 1

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Ex.) Suppose, at the beginning of the season, hockey pundits give the Edmonton Oilers a 25% chance of winning the cup.

A. Express the probability that event will occur as a fraction over 100.

$\frac{25}{100}$

B. Describe the **complement** of this event.

Oilers losing

C. Write the probability of the complement as a percent and a fraction over 100.

$75\% = \frac{75}{100}$

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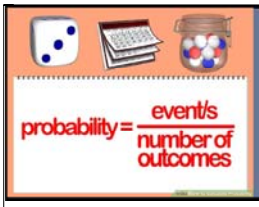

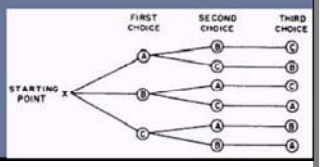

D. The odds of the Oilers winning is their probability of winning (as a percent) divided by their probability of NOT winning (as a percent). Write the Oilers odds of winning as a fraction, and then reduce the fraction. Finally write those odds as a ratio.

$$\frac{P(\text{Oilers winning the cup})}{P(\text{Oilers not winning the cup})} = \frac{25\%}{75\%} = \frac{1}{3} = 1:3$$

E. The odds of the Oilers LOSING (also called "odds against") is the probability of them losing (written as a percent) divided by the probability of them winning (written as a percent). Write the odds of the 'Oilers losing as a fraction and then reduce the fraction. Finally write those odds as a ratio.

$$\frac{P(\text{Oilers not winning the cup})}{P(\text{Oilers winning the cup})} = \frac{75\%}{25\%} = \frac{3}{1} = 3:1$$

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