

2.2 – Basic Probability Concepts

- probability** → represents the fraction of $\frac{\text{DESIRED OUTCOME}}{\text{TOTAL OUTCOME}}$ $P(\text{heads}) = \frac{1}{2} \rightarrow .5 \rightarrow 50\%$
- The probability of an event occurring is always between 0 and 1, inclusive.
 - The closer the probability of an event is closer to 1 then the more likely the event will occur
 - The closer the probability of an event is closer to 0 then the less likely the event will occur
 - Probability can be represented using a tree diagram or using nCr combinations (when selecting more than one*)
 - Probability is stated as a number in three forms: Fraction, Decimal, and Percent

Example 1: Determine the probability using a tree diagram in its three forms.

<p>a.) When <u>two coins</u> are tossed, what is the probability that there will be <u>at least a tail</u>?</p> <p>First Coin H T</p> <p>Second Coin / \ / \</p> <p> H T H T</p> <p>Outcomes: HH HT TH TT</p> <p>$P(\text{at least 1 tail}) = \frac{3}{4} \rightarrow .75 \rightarrow 75\%$</p>	<p>b.) A woman wants three children, what is the probability that she will have 2 boys?</p> <p>1st Child B G</p> <p>2nd Child / \ / \</p> <p> B G B G</p> <p>3rd Child / \ / \ / \</p> <p> B G B G B G</p> <p>Outcomes: BBB / BBG / BGB / BGG / GBB / GGB / GGB / GGG</p> <p>$P(2 \text{ boys}) = \frac{4}{8} \rightarrow .5 \rightarrow 50\%$</p>
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Example 2: Determine the probability using combinations as a percent. *Round to nearest 10th of %*

<p>a.) Ebony has <u>4 male kittens</u> and <u>7 female kittens</u>. She picks up <u>2 kittens</u> to give to a friend. Find the probability for the following: total = 11</p>		<p>b.) Bob is moving and all of his CDs are mixed up in a box. Twelve CDs are rock, eight are jazz, and five are classical. If he reaches into the box and selects them at random, find the probability for... total = 25</p>	
<p>i.) P (2 male)</p> <p>$\frac{\text{desired}}{\text{total}} \rightarrow \frac{nCr}{nCr}$</p> <p>$\frac{4C_2}{11C_2} = \frac{6}{55} \rightarrow 10.9\%$</p>	<p>ii.) P (2 female)</p> <p>$\frac{7C_2}{11C_2} = \frac{21}{55}$</p> <p>$38.2\%$</p>	<p>i.) P (1 classical)</p> <p>$\frac{5}{25} \rightarrow 20\%$</p>	<p>ii.) P (3 jazz)</p> <p>$\frac{8C_3}{25C_3} = \frac{56}{2300} \rightarrow 2.4\%$</p>
<p>iii.) P (1 of each)</p> <p>$\frac{4C_1 \cdot 7C_1}{11C_2}$</p> <p>$\frac{28}{55} = 50.9\%$</p>		<p>iii.) P (2 classical, 1 rock)</p> <p>$\frac{5C_2 \cdot 12C_1}{25C_3} = \frac{120}{2300} \rightarrow 5.2\%$</p>	
<p>iv.) P (1 male, 2 female)</p> <p><u>3 kittens</u></p> <p>0%</p> <p>* Only picking up 2 to give away *</p>		<p>iv.) P (2 jazz, 3 reggae)</p> <p>0%</p> <p>* Does Not Own Reggae *</p>	
<p>v.) P (1 classical, 1 jazz, 2 rock)</p> <p>$\frac{5C_1 \cdot 8C_1 \cdot 12C_2}{25C_4} = \frac{2640}{12650} \rightarrow 20.9\%$</p>		<p>v.) P (1 classical, 1 jazz, 2 rock)</p> <p>$\frac{5C_1 \cdot 8C_1 \cdot 12C_2}{25C_4} = \frac{2640}{12650} \rightarrow 20.9\%$</p>	