**Objective:** Find the theoretical & experimental probability of an event.

**Probability** is the measure of how likely an event is to occur. Each possible result of a probability experiment or situation is an outcome. The sample space is the set of all possible outcomes.

<table>
<thead>
<tr>
<th>Experiment or Situation</th>
<th>Rolling a number cube</th>
<th>Spinning a spinner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Space</td>
<td>(1, 2, 3, 4, 5, 6)</td>
<td>(red, blue, green, yellow)</td>
</tr>
</tbody>
</table>

**Write each fraction as a percent.**

1. \( \frac{1}{4} = 25\% \)
2. \( \frac{2}{3} \approx 66.7\% \)
3. \( \frac{3}{8} \approx 37.5\% \)
4. \( \frac{12}{12} = 100\% \)

**Evaluate.**

5. \( 6 \cdot P_3 = 120 \)
6. \( 5 \cdot P_2 = 20 \)
7. \( 7 \cdot C_4 = 35 \)
8. \( 8 \cdot C_6 = 28 \)

**Entry:** Write each fraction as a percent.

**Notes:**
- Probabilities are written as fractions or decimals from 0 to 1, or as percents from 0% to 100%.
- Ex. 1) What is the probability the pointer lands on Red?

\[ P(\text{red}) = \frac{3}{10} \approx 30\% \]

**Theoretical Probability**

For equally likely outcomes:

\[ P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{number of outcomes in the sample space}} \]

**Ex. 2)** Each letter of the word PROBABLE is written on a separate card. The cards are placed face down and mixed up. What is the probability that a randomly selected card has a consonant?

\[ P(\text{consonant}) = \frac{5}{8} = .625 = 62.5\% \]

**Ex. 3)** Two dice are rolled. What is the probability that the events below will happen?

- \[ P(\text{numbers match}) = \frac{6}{36} = \frac{1}{6} \approx 16.7\% \]
- \[ P(\text{sum is 10}) = \frac{3}{36} = \frac{1}{12} \approx 8.3\% \]
- \[ P(\text{difference is 4}) = \frac{4}{36} = \frac{1}{9} \approx 11.1\% \]
Ex. 4) A red die and a blue die are rolled. If all numbers are equally likely, what is the probability of the event?

\[
P(\text{red cube greater}) = \frac{15}{36} = \frac{5}{12} \approx 41.7%
\]

Ex. 5) You are dealt a card from a standard deck of cards.

\[
P(\text{deal a 7}) = \frac{4}{52} = \frac{1}{13} = 7.7%
\]
\[
P(\text{deal a club}) = \frac{13}{52} = \frac{1}{4} = 25%
\]
\[
P(\text{deal a face card}) = \frac{12}{52} = \frac{3}{13} = 23.1%
\]
\[
P(\text{deal a queen of hearts}) = \frac{1}{52} = 1.9%
\]

Ex. 6) There are 25 students in study hall. The table shows the number of students who are studying a foreign language. What is the probability that a randomly selected student is not studying a foreign language?

\[
P(\text{not foreign}) = \frac{4}{25}
\]

Ex. 7) The table shows the results of a spinner experiment. Find the experimental probability.

<table>
<thead>
<tr>
<th>Number</th>
<th>Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
</tr>
</tbody>
</table>

\[
P(\text{spinning a 4}) = \frac{14}{50} = .28 = 28%
\]
\[
P(\text{spinning a number greater than 2}) = \frac{33}{50} = .66
\]

Ex. 8) The table shows the breakdown of 85 thousand single parents on active duty in the US military. All numbers are in thousands. Use the data in the table to find the probabilities.

<table>
<thead>
<tr>
<th></th>
<th>Air Force</th>
<th>Navy</th>
<th>Marine Corps</th>
<th>Army</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17</td>
<td>3</td>
<td>2</td>
<td>37</td>
<td>60</td>
</tr>
<tr>
<td>Female</td>
<td>18</td>
<td>7</td>
<td>2</td>
<td>34</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>10</td>
<td>4</td>
<td>71</td>
<td>85</td>
</tr>
</tbody>
</table>

a) Find the probability that a randomly selected single parent in the US military is male.

\[
\frac{63}{85} \approx 74.177%
\]

b) Find the probability that a randomly selected single parent in the US military is in the Army.

\[
\frac{76}{85} \approx 89.4747%
\]

c) Find the probability that a randomly selected single parent in the US military is a female in the Air Force.

\[
\frac{4}{85} \approx 4.70588%
\]
Worksheet Time!!!