Worksheet 2-1: Probability Experiments

Probability is a measure of the likelihood that a specific event will occur.

Probability experiments can be used to estimate the probability of an event.

Let's use a probability problem to learn about specific terms related to probability.

Problem: A spinner has 4 equal sectors colored yellow, blue, green and red.

What are the chances of landing on blue after spinning the spinner?
What are the chances of landing on red?

Solution: The chances of landing on blue are 1 in 4, or one fourth.

The chances of landing on red are 1 in 4, or one fourth.

Definition	Example
An **experiment** is a situation involving chance or probability that leads to results called outcomes.	In the problem above, the experiment is spinning the spinner.
An **outcome** is a possible result of a single trial of an experiment.	The possible outcomes are landing on yellow, blue, green or red.
An **event** is one or more outcomes of an experiment.	One event of this experiment is landing on blue.
A **trial** is one round of a probability experiment	One trial of this experiment is one spin.
Probability is the measure of how likely an event is.	The probability of landing on blue is one fourth.

In order to measure probabilities, mathematicians have devised the following formulas for finding the probability and experimental probability of an event.

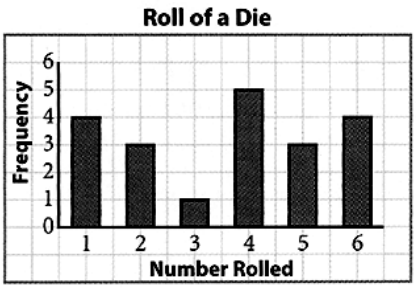
Probability Of An Event
$P(\text{Event A}) = \frac{\text{Number of Ways Event A Can Occur}}{\text{Total Number of Possible Outcomes}}$

Experimental Probability of An Event
$P(\text{Event A}) = \frac{\text{Number of Successful Trials}}{\text{Total Number of Trials}}$

Probability is always a value between 0 (*certain not to happen*) and 1 (*certain to happen*).

Probability can be expressed as a fraction in lowest terms, a decimal or a percent.

1. The results of rolling a six-sided die are displayed in the graph.



(a) How many times was a 5 rolled?

3 times

(b) Find the experimental probability of rolling a 6. Express your answer as a fraction in lowest terms, as a decimal, and as a percent.

$$Pe(6) = \frac{4}{20}$$
$$= \frac{1}{5}$$
$$= 0.2$$
$$= 20\%$$

(c) Find the experimental probability of not rolling a 6. How is this related to the probability of rolling a 6?

$\frac{5}{5} - \frac{1}{5} = \frac{4}{5}$

① Long way

$Pe(\text{Not } 6) = \frac{4+3+1+5+3}{20}$

$= \frac{16}{20}$

$= \frac{4}{5}$

$= 0.8$

$= 80\%$

Short way

$Pe(\text{Not } 6) = 1 - \frac{1}{5}$

$= \frac{4}{5}$

$= 0.8$

$= 80\%$

2. What is the probability of rolling a 7 with a six-sided die?

$P(7) = 0$ Certainly NOT

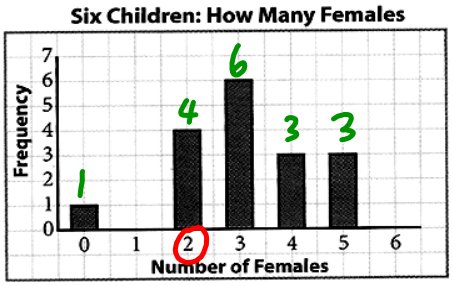
Not a chance!

3. What is the probability of rolling a 1, 2, 3, 4, 5, or 6?

any number from 1 to 6

$P(1,2,3,4,5 \text{ or } 6) = 1$

4. A probability experiment was designed to find the expected number of females in a family of six children. To simulate the genders of the six children, a coin was tossed six times. Heads represented a male; tails represented a female. The experiment was repeated a number of times. The results are shown in the graph.



(a) How many trials were performed?

17 trials.

(b) What is the experimental probability of having two females in a family of six children?

$Pe(2\text{ females}) = \frac{4}{17}$

Please give answer statements!

5. Sam tossed a coin 10 times and heads turned up nine times.

(a) Express the experimental probability of turning up heads as a percent.

$Pe(Head) = \frac{9}{10} = 90\%$

(b) Is the experimental probability what you expected? Explain.

No, I expect it to be 50|50 chance of having a head which is 50%.

Tyler – tossing a coin
→ 10 times

1. T
2. H
3. H
4. T
5. T
6. T
7. H
8. T
9. T
10. T

$Pe(H) = \frac{3}{10}$

6. A coin was tossed 20 times. The experimental probability of turning up tails was 30%.

(a) How many times did the coin turn up tails?

$20 \times 30\% = 20 \times 0.3$
$= 6$ times

∴ The coin turned up tails 6 times.

(b) How many times did the coin turn up heads?

$20 - 6 = 14$ or $20 \times 0.7 = 14$

∴ The coin turned up heads 14 times.

(c) What was the experimental probability of the coin turning up heads? Describe two different methods of finding the answer.

The experimental probability of coin turning up heads was 70%. One method is subtracting 30% from 100%. Another method is dividing 14 by 20 then multiplying by 100.