

Before we begin, are there any questions from last day's homework on experimental probability?

p. 66 # 1 to 4, 6, 7

Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) calculate the **theoretical** probability of an event.

p. 66 # 1, 15 out of 50 Successful

$$\begin{aligned} \text{a) } P(\text{Success}) &= \frac{15}{50} \\ &= \frac{3}{10} \end{aligned}$$

$$\begin{aligned} \text{Decimal} &= 3 \div 10 \\ &= 0.3 \end{aligned}$$

$$\begin{aligned} \text{Percent} &= 0.3 \times 100\% \\ &= 30\% \end{aligned}$$

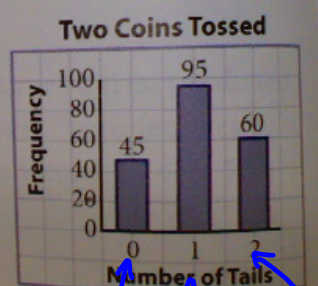
$$\text{b) } P(\text{Unsuccessful}) = \frac{7}{10}$$

$$\left. \begin{aligned} n \\ &= 1 - \frac{3}{10} \\ &= \frac{7}{10} \end{aligned} \right\}$$

For help with question 4, refer to Example 2.

4. Two coins were tossed a total of 200 times. The results are shown in the graph. Find the experimental probability for each event.

- a) two heads
b) one head
c) two tails



$$\begin{aligned} \text{a) } P(2H) &= \frac{45}{200} \\ &= \frac{9}{40} \end{aligned}$$

$$\begin{aligned} \text{b) } P(1H) &= \frac{95}{200} \\ &= \frac{19}{40} \end{aligned}$$

$$\begin{aligned} \text{c) } P(2T) &= \frac{60}{200} \\ &= \frac{6}{20} \\ &= \frac{3}{10} \end{aligned}$$

MBF 3CI

2.2 Theoretical Probability

Date: Sept. 26/17

From a probability experiment,

$$\text{Experimental probability} = \frac{\text{number of trials with successful outcomes}}{\text{number of trials}}$$

From the probability experiment with the coin from a previous class...



launch Fathom

# Trials = 10	# Trials = 100	# Trials = 25000
$\frac{2}{10}$ $= 0.2$ $= 20\%$	$\frac{49}{100}$ $= 0.49$ $= 49\%$	$\frac{12423}{25000}$ ≈ 0.49692 $\approx 49.69\%$

In a probability experiment, if trials are repeated "again and again,"

(such as thousands or millions of times) the experimental probability will tend to equal the theoretical probability.

This is known as the ...

Law of Large Numbers

☺ The theoretical probability should be able to be calculated without first calculating the experimental probability! ☺

The ***theoretical*** probability of an event occurring is:

$$\text{Theoretical probability (of an event)} = \frac{\text{number of successful outcomes}}{\text{number of possible outcomes}}$$

And now for a discussion about RRRRRRRRRRRRoll up the rim...

(see the Smartboard for a simulation of the game)

launch Fathom

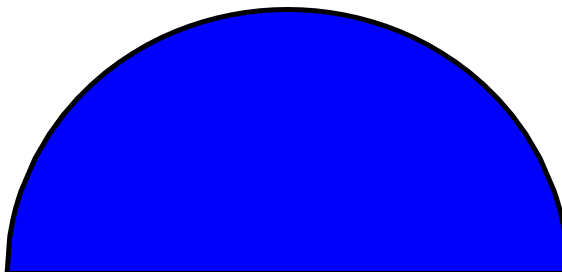
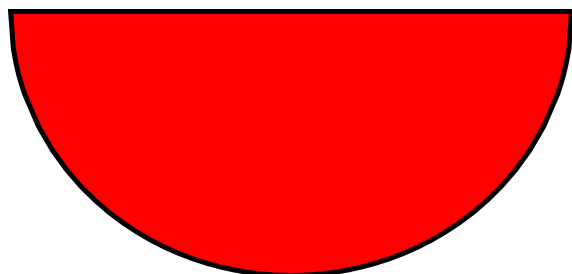
# Trials = 6	# Trials = 25000
P (win) = $\frac{0}{6}$	P (win) = $\frac{4209}{25000}$
= 0	= 16.83%



$$\frac{1}{6} = 0.\overline{16}$$

To select an item at **random** means to choose the item not following a pattern or rule. Selecting the item must be “by chance”.

Some ways to select items at random are....	Some ways to not select items at random are....
<p>computer random generator</p> <p>drawing from a hat</p> <p>lip a coin</p>	<p>alphabetical</p> <p>tallest/shortest</p> <p>birthdays</p> <p>wearing a certain colour; ex. red</p>



From now on, when a question says, "...and the probability..." we always assume they are asking for the theoretical probability.

Express all final answers as a fraction in lowest terms.

Ex. 1: A pet store has 8 cats, 9 dogs and 3 gerbils.

If Jocelyn randomly picks a pet, find the probability that she:

a) picks a cat

$$P(\text{picks a cat}) = \frac{\text{number of cats}}{\text{number of possible pets}}$$

$$= \frac{8}{20}$$

$$= \frac{2}{5}$$

$$= 0.40$$

b) does not pick a cat

$$P(\text{does not pick a cat}) = \frac{\text{number of non-cats (other pets)}}{\text{number of possible pets}}$$

$$= \frac{12}{20}$$

$$= \frac{3}{5}$$

$$= 0.60$$

$P(\text{does not pick a cat})$

$= 1 - P(\text{picks a cat})$

$$= 1 - \frac{2}{5}$$

$$= \frac{3}{5}$$

$$= 1 - 0.4$$

$$= 0.6$$

Ex. 2: With a pair of fair dice, find the probability of:

SUM		Blue Die					
		1	2	3	4	5	6
Red Die	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

a) Rolling a total of 7 = $\frac{6}{36}$

b) Rolling an odd total = $\frac{18}{36} = \frac{1}{2}$

c) Rolling a sum of 7 or less = $\frac{21}{36} = \frac{7}{12}$

d) Rolling a total of 3 or 6 = $\frac{2+5}{36} = \frac{7}{36}$

e) P(sum of 14) = $\frac{0}{36} = 0$

Entertainment: pp.73-75 #3, 4, 5, 6, 8, 9, 11*, 12

(*For #11, you need the formula for the area of a circle: $A = \pi r^2$)

Attachments



2.ftm



2.ftm



2.ftm



2.ftm



2.2 Theoretical Probability-Coin Flip(Spring 2014-new).ftm



2.2 Theoretical Probability (Roll Up_Spring 2014_new).ftm