

6th Grade FM: How do we find the probability of an event?

Jolly Rancher Colors:

Green	5
Red	1
Purple	4
Blue	2

Sample Space :

G,G,G,G,G,R,P,P,P,P,B,B

Total 12

$$P(\text{blue}) = \frac{2}{12} \rightarrow \frac{1}{6} \rightarrow \text{Theoretical} \rightarrow \text{Theory}$$

Probability Favorable Outcome \rightarrow want 1 in 6 chance of getting a blue.

Experiment: Each student will pick a jolly rancher and put it back.

Green	5
Red	6
Purple	10
Blue	3

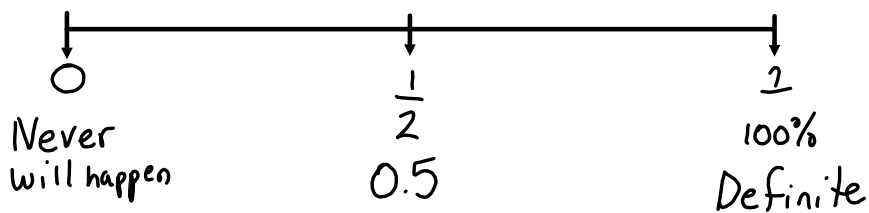
Experimental Physically doing

24 T.

\rightarrow If you do this at least 1,000 times \rightarrow closer to the theoretical p

$$P(\text{blue}) = \frac{3}{24} \rightarrow \frac{1}{8}$$

$$P(\text{outcome}) = \frac{\text{\# of favorable outcomes}}{\text{total \# of outcomes}} \quad \frac{\text{Part}}{\text{Whole}}$$



A Probability?

0.7	✓
5/5	✓
5/3	NO
1.4	NO
1/4	✓

7 out of 10 chance (70%)

1 \rightarrow 100% chance

over 1

over 1

1 out of 4 (25%)

Theoretical Probability: Probability based on what should happen. (Theory)

Experimental Probability: Probability based on what actually happened. (Physical)

Sample Space: List of all outcomes

Ex:

Simple Probability:

Ex 1: Roll a die: Theoretical
 \rightarrow #cube (6 sides 1-6)

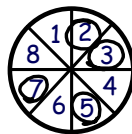
$$P(>2) = \frac{4}{6} = \frac{2}{3}$$

1, 2 $\overbrace{3, 4, 5, 6}^*$

Prime
 Exactly \rightarrow Factors are itself and 1
 two factors

Ex 2: Spinner: Theoretical

$$* P(\text{Prime}) = \frac{4}{8} = \frac{1}{2}$$



1 \rightarrow only 1 factor
 not prime

Composite #'s \rightarrow more than 2 factors

Ex 3: John's grades: Experimental

B, B, A, C, A, A, D

$$P(B) = \frac{2}{7}$$

Theoretical
 $A, B, C, D, F \frac{1}{5}$

Making a chart to list outcomes: Compound Probability

Example 1: Rolling Two Dice and multiplying the results ^{2 or more events}

$$P(8) = \frac{2}{36}$$

$$= \frac{1}{18}$$

$$P(\text{even}) = \frac{18}{36}$$

$$P(\text{odd}) = \frac{18}{36}$$

$$P(>5) = \frac{26}{36}$$

$$= \frac{13}{18}$$

$$P(\text{even} > 5) = \frac{22}{36}$$

$$= \frac{11}{18}$$

$$P(\text{even or } > 5) = \frac{31}{36}$$

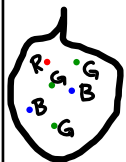
and
true for 1

Die 1

X	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

36 outcomes

Example 2: Picking a marble and rolling a die.



die (2nd)

	1	2	3	4	5	6
R	R1	R2	R3	<u>R4</u>	R5	R6
G	G1	G2	G3	<u>G4</u>	G5	G6
G	G1	G2	G3	<u>G4</u>	G5	G6
G	G1	G2	G3	<u>G4</u>	G5	G6
B	<u>B1</u>	<u>B2</u>	<u>B3</u>	<u>B4</u>	<u>B5</u>	<u>B6</u>
B	<u>B1</u>	<u>B2</u>	<u>B3</u>	<u>B4</u>	<u>B5</u>	<u>B6</u>

36 outcomes

$$P(Y, 3) = \frac{0}{36} \rightarrow 0$$

order matters

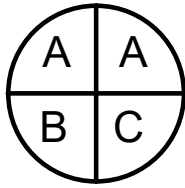
$$P(4, B) = \frac{0}{36} \rightarrow 0$$

$$P(B \text{ or } 4) = \frac{16}{36} \rightarrow \frac{4}{9}$$

$$P(B, 4) = \frac{2}{36} \rightarrow \frac{1}{18}$$

Example 3: Spinning the following spinner twice.

(compound)



$$P(B,B) = \frac{1}{16}$$

$$P(A,A) = \frac{4}{16}$$

$$P(A,C) = \frac{4}{16}$$

$$P(C,D) = \frac{0}{16} \rightarrow 0$$

Spin 1

Spin 2

	A	A	B	C
A	AA	AA	BA	CA
A	AA	AA	BA	CA
B	AB	AB	BB	CB
C	AC	AC	BC	CC

16 outcomes

Probability Packets 1A and 1B

