

5.9 Mutually Exclusive Events.notebook



probability = $\frac{\text{event/s}}{\text{number of outcomes}}$



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Janet and Violet are playing a board game. To move on this turn, Janet must roll either doubles or a sum of 7 with the two dice. What is the probability Janet will move on this turn?

A. Create an outcome table for the sample space of a pair of dice.

	1	2	3	4	5	6
1	(1,1)	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,5	3,6
4	4,1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	5,6
6	6,1	6,2	6,3	6,4	6,5	6,6

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probability = $\frac{\text{event/s}}{\text{number of outcomes}}$



B. Circle all the doubles in the above table. Determine the probability of Janet throwing doubles.

$$\frac{6}{36} = \frac{1}{6} = 17\%$$

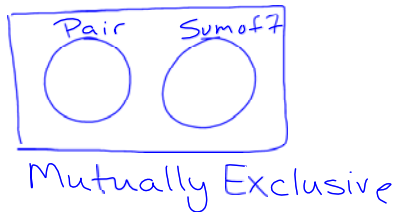
C. Triangle all the 7's in the above table. Determine the probability of Janet throwing a 7.

$$\frac{1}{6} = 17\%$$

D. What is the probability Janet will move on this turn?

$$\frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3} = 33\%$$

E. Illustrate rolling doubles and rolling 7's with a Venn diagram.



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F. Write the definition of Mutually Exclusive below:

Two events that do NOT occur at the same time.

G. Using set notation, show that the intersection of rolling doubles and rolling a seven are the empty set.

$D \cap S = \emptyset = \{ \}$
intersection

H. One student showed the below using set notation. Is the student correct? Explain their notation using English words.

$P(A \cup B) = \frac{n(A \cup B)}{n(U)} = \frac{12}{36} = \frac{1}{3}$

of doubles and the # of 7's

↑ probability of continuing your turn (rolling doubles or 7's)
↑ total # of possible die rolls

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probability = $\frac{\text{event/s}}{\text{number of outcomes}}$



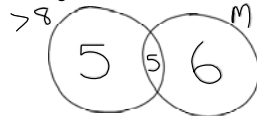
Ex.) In the same game, you get a 100 point bonus if you roll a sum greater than 8 or a multiple of 5. From the table on the opposite side, determine the number of "successes".

A. What is the probability Violet will get the bonus on her next roll?

> 8 + multiple of 5

10 + 11 = 21 - 5 = 16 counted twice

B. Use a Venn diagram to show the situation in 'A' above.



C. Determine the probability of Violet getting her 100 point bonus using set notation.

$$P(\text{sum}) = \frac{n(\text{sum})}{n(U)} = \frac{16}{36} = \frac{4}{9} = 44\%$$

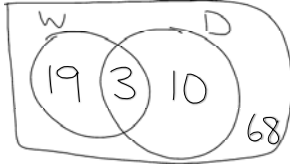
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Ex.) You buy a washer and dryer for \$2500 with a 1-year warranty. The salesman offers you a 3-year warranty for an extra \$450. You research the repair statistics for this brand of washer and dryer and find the following:

Appliance	Percentage repaired within extended warranty	Average Repair Cost
Washer	22%	\$400
Dryer	13%	\$300
Both	3%	\$700

A. Draw a Venn diagram using the amounts from the percentage column above. Using the results from the Venn diagram, decide if you should purchase the extended warranty.



B. Looking at cost (or savings) of repairing the machines or buying the warranty, decide if you should purchase the extended warranty.

Not worth it.

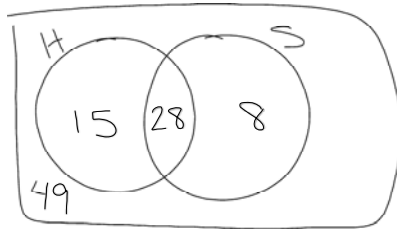
$$W: 450 - 400 = \$50$$

$$D: 450 - 300 = \$150$$

$$W \& D: 450 - 700 = \text{\textcancel{\$}}250$$

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Ex.) A certain model car is being distributed in Western Canada. 43% of the models have heated seats, 36% have a sunroof and 49% have neither. Using a Venn diagram and set notation, determine the probability of a dealership getting that model with *both* heated seats and a sunroof.



$$43 + 36 - x = 51$$

$$79 - x = 51$$

$$\begin{array}{r} +x \\ +x \end{array}$$

$$79 = 51 + x$$

$$-51 - 51$$

$$x = 28$$

$P(H \cap S) = 28\%$

Pg. 176 # 4-6, 11, 12, 14, 16.

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