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Unit 8, Lesson 9: Multi-step Experiments

Let's look at probabilities of experiments that have multiple steps.

9.1: True or False?

Is each equation true or false? Explain your reasoning.

$$8 = (8 + 8 + 8 + 8) \div 3$$

$$(10 + 10 + 10 + 10 + 10) \div 5 = 10$$

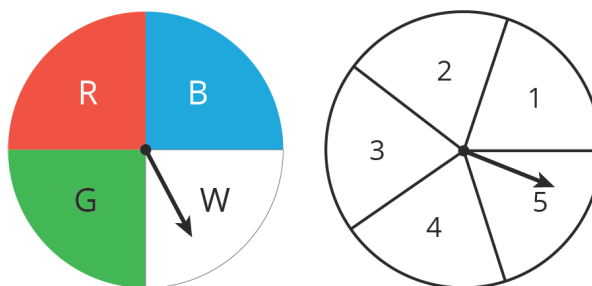
$$(6 + 4 + 6 + 4 + 6 + 4) \div 6 = 5$$

9.2: Spinning a Color and Number

The other day, you wrote the sample space for spinning each of these spinners once.

What is the probability of getting:

1. Green and 3?
2. Blue and any odd number?
3. Any color other than red and any number other than 2?



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9.3: Cubes and Coins

The other day you looked at a list, a table, and a tree that showed the sample space for rolling a number cube and flipping a coin.

1. Your teacher will assign you one of these three structures to use to answer these questions. Be prepared to explain your reasoning.

- a. What is the probability of getting tails and a 6?
- b. What is the probability of getting heads and an odd number?

Pause here so your teacher can review your work.

2. Suppose you roll two number cubes. What is the probability of getting:

- a. Both cubes showing the same number?
- b. *Exactly* one cube showing an even number?
- c. *At least* one cube showing an even number?
- d. Two values that have a sum of 8?
- e. Two values that have a sum of 13?

3. Jada flips three quarters. What is the probability that all three will land showing the same side?

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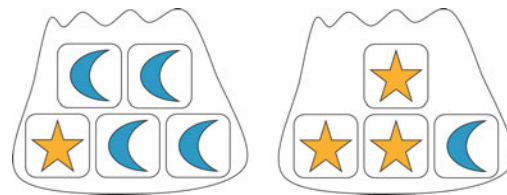
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Are you ready for more?

In a game using five cards numbered 1, 2, 3, 4, and 5, you take two cards and add the values together. If the sum is 8, you win. Would you rather pick a card and put it back before picking the second card, or keep the card in your hand while you pick the second card? Explain your reasoning.

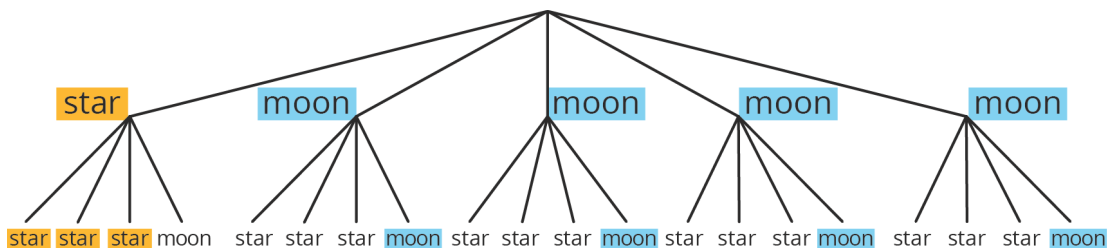
Lesson 9 Summary

Suppose we have two bags. One contains 1 star block and 4 moon blocks. The other contains 3 star blocks and 1 moon block.



If we select one block at random from each, what is the probability that we will get two star blocks or two moon blocks?

To answer this question, we can draw a tree diagram to see all of the possible outcomes.



There are $5 \cdot 4 = 20$ possible outcomes. Of these, 3 of them are both stars, and 4 are both moons. So the probability of getting 2 star blocks or 2 moon blocks is $\frac{7}{20}$.

In general, if all outcomes in an experiment are equally likely, then the probability of an event is the fraction of outcomes in the sample space for which the event occurs.

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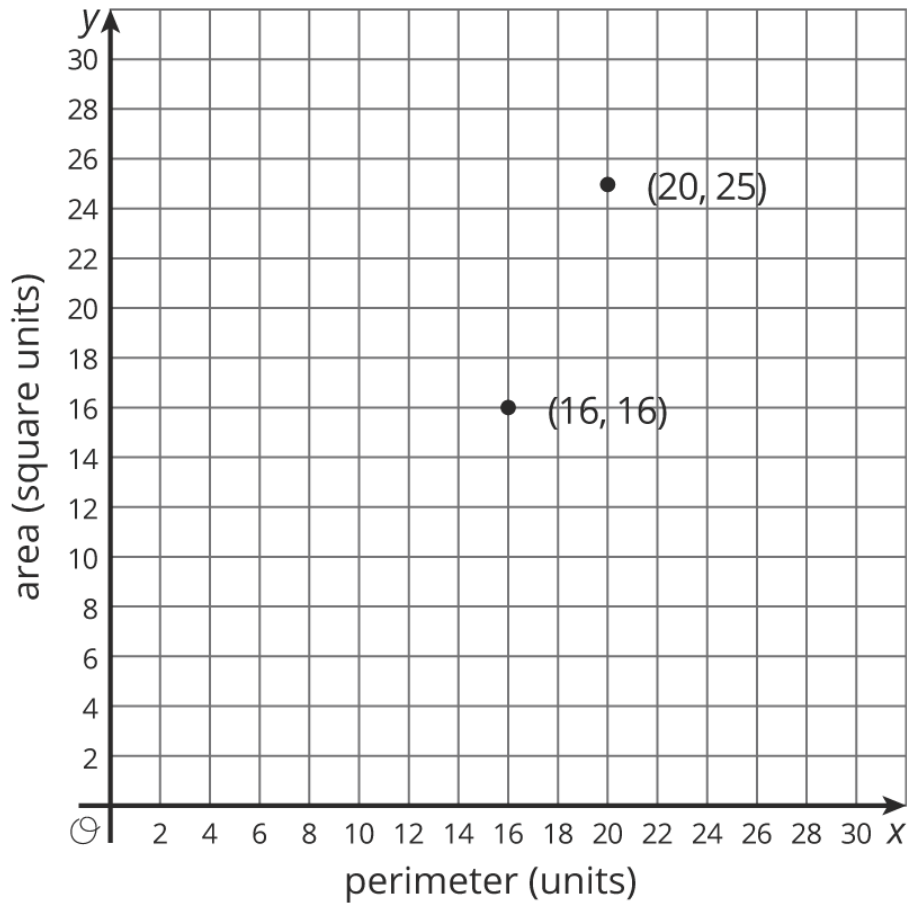
Unit 8, Lesson 9: Multi-step Experiments

1. A vending machine has 5 colors (white, red, green, blue, and yellow) of gumballs and an equal chance of dispensing each. A second machine has 4 different animal-shaped rubber bands (lion, elephant, horse, and alligator) and an equal chance of dispensing each. If you buy one item from each machine, what is the probability of getting a yellow gumball and a lion band?
2. The numbers 1 through 10 are put in one bag. The numbers 5 through 14 are put in another bag. When you pick one number from each bag, what is the probability you get the same number?
3. When rolling 3 standard number cubes, the probability of getting all three numbers to match is $\frac{6}{216}$. What is the probability that the three numbers *do not* all match? Explain your reasoning.
4. For each event, write the sample space and tell how many outcomes there are.
 - a. Roll a standard number cube. Then flip a quarter.
 - b. Select a month. Then select 2020 or 2025.(from Unit 8, Lesson 8)
5. On a graph of the area of a square vs. its perimeter, a few points are plotted.
 - a. Add some more ordered pairs to the graph.

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b. Is there a proportional relationship between the area and perimeter of a square? Explain how you know.

(from Unit 2, Lesson 11)