

Domino Division

In “Domino Designer” on page 4, you divided with fractions to learn about elaborate domino designs. Use what you learned to answer five more questions.

1. Hevesh wants to build a line of dominoes 72 inches long, with each domino spaced $1\frac{1}{5}$ inches apart from front edge to front edge. How many dominoes will she need?
2. Hevesh wants to make 2 lines of dominoes that are both 21 inches long. Each line has dominoes spaced $1\frac{1}{2}$ inches apart. How many dominoes will she need for both lines?
3. She then makes a line of dominoes $41\frac{1}{4}$ inches long, with dominoes spaced $1\frac{1}{4}$ inches apart. How many dominoes will she need?
4. As a centerpiece for a design, Hevesh builds a tower 72 in. tall made of dominoes that are $2\frac{2}{5}$ in. tall. How many rows of dominoes stacked on top of each other will her tower have?
5. Giant wooden dominoes weigh $4\frac{7}{13}$ ounces. Hevesh has a pile of dominoes that weighs 354 ounces. She needs 113 dominoes for a giant city made of dominoes. How many dominoes are in the pile? Will she have enough to build the giant city?

Reciprocals

An important part of dividing fractions is finding **reciprocals**. Reciprocals are two numbers that when multiplied together equal 1.

EXAMPLE 1: What is the reciprocal of 7?

Step 1: Write the number as a fraction.

$$\frac{7}{1}$$

Step 2: Replace the numerator with the denominator. Then replace the denominator with the numerator.

$$\frac{7}{1} \rightarrow \frac{1}{7}$$

Step 3: Multiply your reciprocals to check that the result equals 1.

$$\frac{7}{1} \times \frac{1}{7} = \frac{7}{7} = 1$$

So $\frac{1}{7}$ is the reciprocal of 7.

EXAMPLE 2: What is the reciprocal of $2\frac{1}{3}$?

Step 1: Convert the mixed number into an improper fraction.

$$2\frac{1}{3} = \frac{7}{3}$$

Step 2: Replace the numerator with the denominator. Then replace the denominator with the numerator.

$$\frac{7}{3} \rightarrow \frac{3}{7}$$

Step 3: Multiply your reciprocals to check that the result equals 1.

$$\frac{7}{3} \times \frac{3}{7} = \frac{21}{21} = 1$$

So $\frac{3}{7}$ is the reciprocal of $2\frac{1}{3}$.

YOUR TURN

Use your knowledge of reciprocals to answer each question below.

1. Which fraction is the reciprocal of 23?

- Ⓐ $\frac{23}{1}$ Ⓒ $\frac{1}{23}$
 Ⓑ $\frac{23}{32}$ Ⓓ $\frac{1}{32}$

2. Which fraction is the reciprocal of $3\frac{4}{7}$?

- Ⓐ $\frac{25}{7}$ Ⓒ $\frac{7}{21}$
 Ⓑ $\frac{7}{24}$ Ⓓ $\frac{7}{25}$

3. What is the reciprocal of $\frac{6}{11}$?

4. What is the reciprocal of $4\frac{13}{18}$?

5. Find the reciprocal of 8 and multiply it by the reciprocal of $3\frac{2}{5}$. What is your answer?

6. Find the reciprocals of the following numbers: $\frac{7}{18}$, 2, $\frac{2}{7}$, $5\frac{1}{2}$, $\frac{8}{24}$. Then order the reciprocals from greatest to least.

NAME: _____

EXIT SLIP **A**

 JANUARY 20, 2020 > p. 4 Domino Designer > **DIVIDING FRACTIONS**

1. When dividing with fractions, you _____.

- A flip both fractions
- B change all fractions to mixed numbers
- C use the reciprocal of the quotient
- D use the reciprocal of the divisor

2. A domino designer makes a line of dominoes that is 25 inches long, with dominoes spaced $1\frac{1}{4}$ inches apart from front edge to front edge. How many dominoes are in the line?

CHECK YOUR UNDERSTANDING:

 Want help Need practice Almost there Got it!

NAME: _____

EXIT SLIP **B**

 JANUARY 20, 2020 > p. 4 Domino Designer > **DIVIDING FRACTIONS**

1. Hevesh makes 3 lines of dominoes that are each 18 inches long. Two lines have dominoes spaced $1\frac{1}{2}$ in. apart, and the third line has dominoes spaced $\frac{3}{5}$ in. apart from front edge to front edge. How many total dominoes will she need for all 3 lines?

CHECK YOUR UNDERSTANDING:

 Want help Need practice Almost there Got it!

Cathedral Conversions

In “After the Fire” on page 6, you used conversion factors to find different measurements of the Notre-Dame cathedral in Paris, France. Use what you learned to answer five more questions. Round all answers to the nearest hundredth when necessary.

1. Notre-Dame is 127 meters long. What’s that in pieds du Roi? (*10 meters = 30.90 pieds du Roi*)
2. The main nave, or central part, of Notre-Dame is 150 pieds du Roi tall. What’s that in inches? (*1 pied du Roi = 12.8 inches*)
3. The large southern rose window made of stained glass is 1,290 centimeters wide. What is that in pieds du Roi? (*0.5 pieds du Roi = 16.24 cm*)
4. The smallest rose window of Notre-Dame is 10.5 yards wide. What is that in pieds du Roi? (*2.8 pieds du Roi = 1 yard*)
5. The oldest bell at Notre-Dame is called Emmanuel. It has a diameter of 261 cm. Another bell called Jean-Marie has a diameter of 39.3 inches. Which bell is wider, and by how much? (*1 cm = 0.39 in.*)

Metric Lengths

The **metric system** is the international decimal system of weights and measures, such as the meter for length. However, in the U.S. we use customary units, including the inch, foot, yard, and mile. You can use a conversion table to convert between the two measurement systems.

EXAMPLE 1: Use the conversion table below to convert 5 inches to centimeters.

LENGTH UNIT CONVERSION TABLE		
METRIC UNIT	METRIC EQUIVALENT	CUSTOMARY EQUIVALENT
1 mm	0.1 cm	0.03937 inch (in.)
1 cm	10 mm	0.3937 in.
1 m	100 cm	3.2808 feet (ft)
1 km	1,000 m	0.6214 mile (mi)

Step 1: Identify your unit conversion factor. You may need more than one.

$$0.3937 \text{ in.} = 1 \text{ cm}$$

Step 2: Write your conversion factor as a ratio. Set up your ratio so that the unit you are converting from is in the denominator.

$$\frac{1 \text{ cm}}{0.3937 \text{ in.}}$$

Step 3: Multiply your given measurement by the ratio you set up in step 2.

$$5 \text{ in.} \times \frac{1 \text{ cm}}{0.3937 \text{ in.}}$$

Step 4: Cross out like units and solve.

$$5 \text{ in.} \times \frac{1 \text{ cm}}{0.3937 \cancel{\text{ in.}}} = 12.7 \text{ cm}$$

So 5 inches is equal to 12.7 centimeters.

YOUR TURN

Use the conversion table to the left to solve the following questions. Round all answers to the nearest hundredth when necessary.

- Notre-Dame de Paris was built on an island in the River Seine known as Île-de-la-cité, or "Island of the City." At the island's widest point, it measures around 280 meters. How many feet is that?
- A cathedral in Covington, Kentucky, built in 1910 is nicknamed the miniature Notre-Dame because it looks so much like the French cathedral. The distance between Covington and Paris is 4,177 miles. How many kilometers is that?
- Before being destroyed in the fire, Notre-Dame's spire was 295 feet tall. How many centimeters is that?
- Which of the following measurements is not equal to 10 mm?

(A) 1 cm	(C) 0.001 m
(B) 0.3937 in.	(D) 0.0328 ft
- Which of the following would not be a realistic measurement for the distance between your classroom door and your teacher's desk if they are on opposite ends of the room? Explain.

(A) 0.02 km	(C) 4,500 mm
(B) 400 cm	(D) 3.5 m

NAME: _____

EXIT SLIP **A**

 JANUARY 20, 2020 > p. 6 After The Fire > **PROPORTIONAL MEASUREMENTS**

1. True or False: When setting up a proportion using a conversion factor, you should put the numerator and denominator in the same units on both sides of the proportion.

2. A statue is 7.5 feet tall. What's that in centimeters? ($1 \text{ ft} = 30.48 \text{ cm}$)

CHECK YOUR UNDERSTANDING:

 Want help *Need practice* *Almost there* *Got it!*

NAME: _____

EXIT SLIP **B**

 JANUARY 20, 2020 > p. 6 After The Fire > **PROPORTIONAL MEASUREMENTS**

1. A musical organ is 10.3 *pieds du Roi* tall. What is its height in millimeters?
($1 \text{ pied du Roi} = 325 \text{ millimeters}$)

2. A piece of paper is 8.5 inches wide. What is this in *pieds du Roi*?
($0.5 \text{ pied du Roi} = 6.4 \text{ in.}$)

CHECK YOUR UNDERSTANDING:

 Want help *Need practice* *Almost there* *Got it!*

Poop Percents

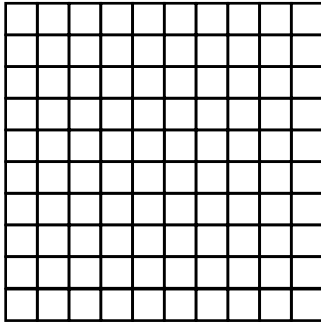
In “Lessons From Poop” on page 8, you used percents to find the amount of penguin poop located on different islands of the Antarctic Peninsula. Use what you learned to answer five more questions about other penguin species. Round answers to the nearest whole number.

1. There are 18 different penguin species. The conservation group BirdLife International has estimated the population of 89% of them. How many species has BirdLife International assessed?
2. BirdLife International estimates a total population of 40,168,770 penguins across all the species it has assessed. Adélie penguins make up 12% of that population total. What is the estimated population of Adélie penguins?
3. The total population for the 5 endangered penguin species is 828,770. The northern rockhopper penguin makes up 64% of that population. What is the estimated population of the northern rockhopper penguin?
4. The total population of vulnerable penguin species is 22,271,000. The royal penguin makes up 8% of that population. What is the estimated population of the royal penguin?
5. The Magellanic penguin makes up 30% of the total population of near-threatened penguin species. The Magellanic penguin population is 2,612,700. What is the estimated total population of near-threatened penguins?

Modeling Percents

A **percent** is a ratio with a denominator of 100 that represents part of a whole. You can use a 10-by-10 grid to model different percents. Each unit square shaded represents 1 percent.

EXAMPLE: Model 27% using the grid below.



Step 1: Convert the percent to a fraction out of a hundred.

$$27\% = \frac{27}{100}$$

Step 2: Write out the fraction as a sum of its parts.

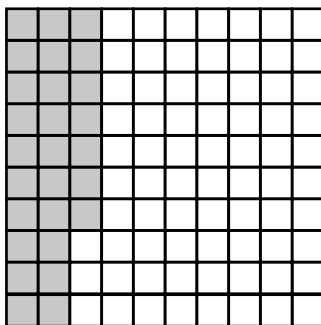
$$\frac{27}{100} = \frac{20}{100} + \frac{7}{100}$$

Step 3: Determine how many tenths and hundredths make up the fraction.

$$\frac{20}{100} = \frac{2}{10} \rightarrow \text{2 rows or columns of 10 unit squares}$$

$$\frac{7}{100} = 7 \text{ unit squares}$$

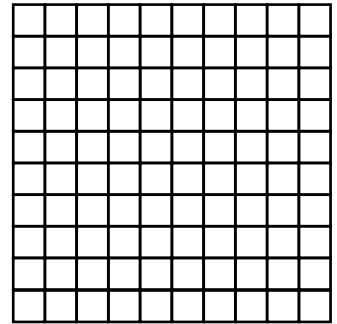
Step 4: Shade in the corresponding number of unit squares on the grid.



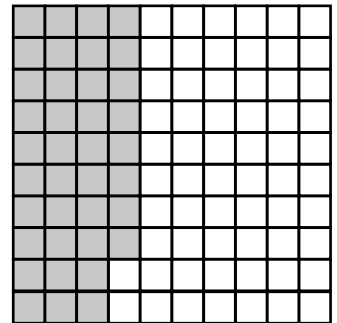
YOUR TURN

Use the grids below to identify or model the percents in each question.

1. Although Adélie penguin numbers are increasing overall, populations in some parts of the Antarctic have dropped by 65% over the past 25 years. Model this percent in the grid to the right.

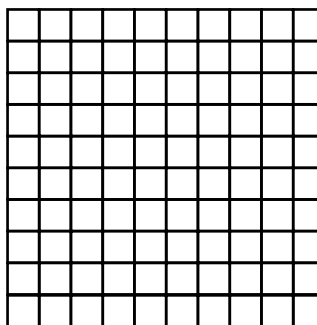


2. The grid to the right models the percent of Adélie penguins that live in the Ross Sea, a bay of the Southern Ocean in Antarctica. What percent of Adélie penguins live in the Ross Sea?

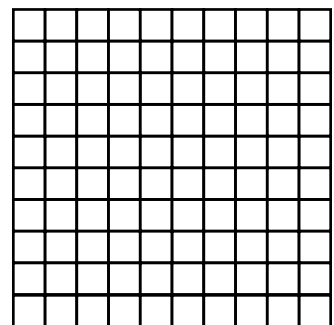


3A. There are 18 species of penguins. Only 2 of them—Adélie and Emperor penguins—live in the Antarctic. What percent of all penguin species live in the Antarctic, rounded to the nearest whole percent?

3B. Model this percent in the grid below.



3C. Model the percent of penguin species that do not live in the Antarctic in the grid below.



NAME: _____

EXIT SLIP **A**

 JANUARY 20, 2020 > p. 8 Lessons From Poop > **PERCENT OF A NUMBER**

1. A percent _____.

- A is a ratio out of 100
- B can be represented as a decimal
- C is a way to compare parts of a whole
- D is all of the above

2. About 97,221 adult penguins live on Brash Island. Of those penguins, 97.67% are Adélie penguins. How many Adélie penguins live on Brash Island? Round your answer to the nearest whole number.

CHECK YOUR UNDERSTANDING:

 Want help Need practice Almost there Got it!

NAME: _____

EXIT SLIP **B**

 JANUARY 20, 2020 > p. 8 Lessons From Poop > **PERCENT OF A NUMBER**

1. There are 292,390 nests on Heroina Island. Of those nests, 0.009% belong to chinstrap penguins. How many chinstrap penguin nests are there on Heroina Island? Round your answer to the nearest whole number.

CHECK YOUR UNDERSTANDING:

 Want help Need practice Almost there Got it!

Watch and Learn

Read the article “Lessons From Poop” (pp. 8-11). Also watch the video “All About Penguins” on the *Scholastic MATH* website. Use the article and video to answer the questions below.

- 1.** Both the article and the video are about penguins. How is the purpose of the article different from the purpose of the video?

- 2.** What are two facts about penguins that you learned from the article that were not in the video?

- 3.** What are two facts you learned from the video that were not in the article?

- 4.** Which source—the article or the video—gave you a clearer understanding of penguins? Use details from the article and the video to support your answer.

Game Day Data

In “Big Game Big City” on page 14, you made a dot plot to compare the cities that have hosted the NFL Super Bowl. Use what you learned to answer five more questions about Super Bowl wins by team.

Number of Super Bowl Wins by Team

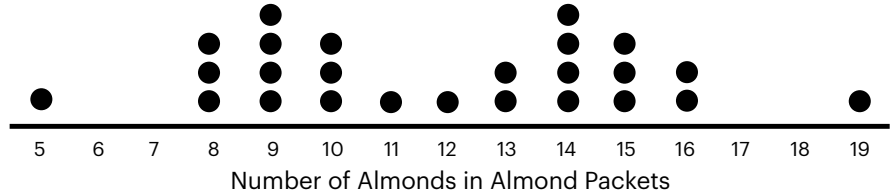
Team	Number of Wins
New England Patriots	6
Pittsburgh Steelers	6
Dallas Cowboys	5
San Francisco 49ers	5
Green Bay Packers	4
New York Giants	4
Denver Broncos	3
Oakland Raiders	3
Washington Redskins	3
Baltimore Ravens	2
Indianapolis Colts	2
Miami Dolphins	2
Chicago Bears	1
Kansas City Chiefs	1
New Orleans Saints	1
New York Jets	1
Philadelphia Eagles	1
St. Louis Rams	1
Seattle Seahawks	1
Tampa Bay Buccaneers	1

1. What category or value should be used for a dot plot to represent this data?
2. How many total dots will the dot plot have? What does this number represent?
3. On a separate sheet of paper, make a dot plot representing the data in the chart above.
4. What is the median number (middle value) of times an individual team has won the Super Bowl?
5. Write one conclusion you could make from your dot plot related to the number of wins by different teams in the Super Bowl.

Clusters and Outliers

You may find **clusters** and **outliers** in a dot plot. A cluster is formed when multiple data points are concentrated in a particular range and tells you which values are common. An outlier is a data value that is much greater than or much less than the other data and tells you which values are uncommon.

EXAMPLE: Kara bought a box of snack-sized almond packets. She counted the number of almonds in each packet. The dot plot to the right shows the results. Identify any clusters or outliers in the data set.



Step 1: Determine if there are any clusters.

There are 10 packets that have from 8 to 10 almonds in them and there are 11 packets that have from 13 to 16 almonds in them. Both ranges represent concentrated areas of data points.

Step 2: Determine if there are any outliers.

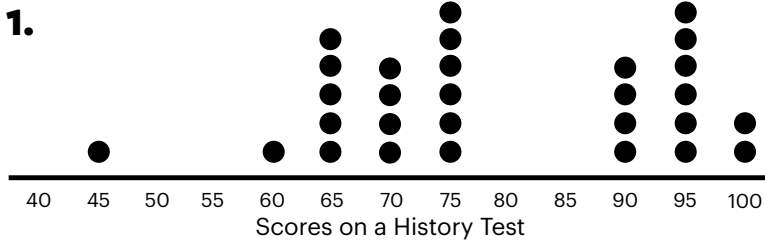
Most of the packets have from 8 to 16 almonds in them. The observation of 5 almonds is much less than the other values and the observation of 19 almonds is much greater than the others. Also, both values have only one data point.

So the clusters are almond packets containing from 8 to 10 almonds and from 13 to 16 almonds.

So the outliers are almond packets containing 5 almonds and 19 almonds.

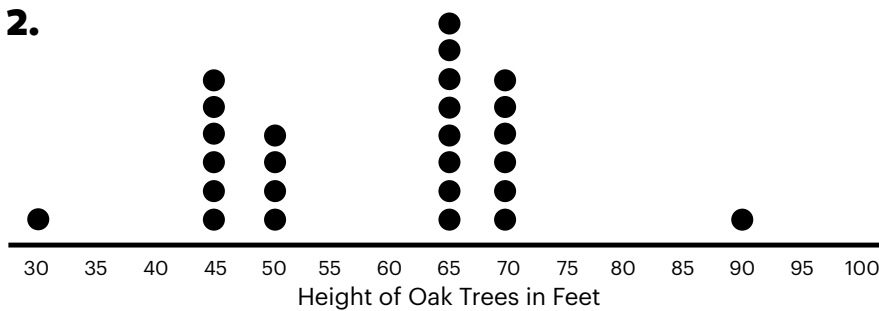
YOUR TURN

Identify and explain the clusters and outliers in each dot plot below.



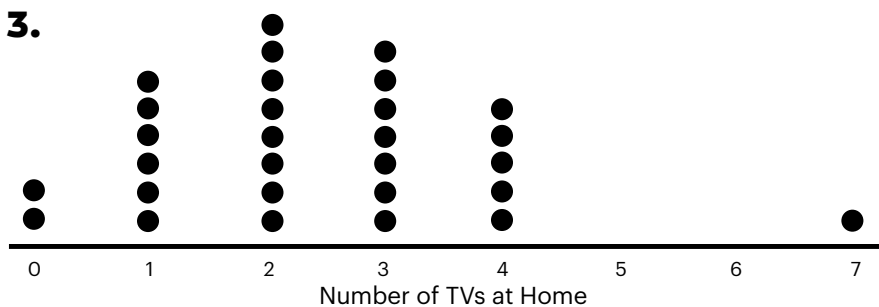
Clusters:

Outliers:



Clusters:

Outliers:



Clusters:

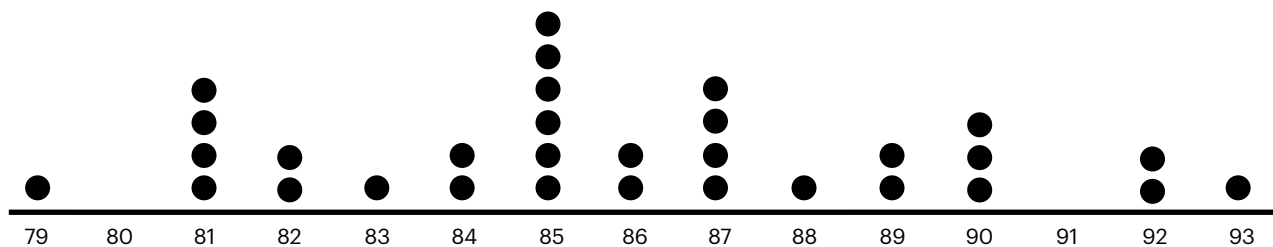
Outliers:

NAME: _____

EXIT SLIP **A**

JANUARY 20, 2020 > p. 14 Big Game Big City > **DOT PLOTS**

Test Scores in Ms. C's Class



- How many students are in Ms. C's class?
- What is the highest score on the test in Ms. C's class?
- How many students scored an 85 or higher on the test?

CHECK YOUR UNDERSTANDING:

Want help

Need practice

Almost there

Got it!

NAME: _____

EXIT SLIP **B**

JANUARY 20, 2020 > p. 14 Big Game Big City > **DOT PLOTS**

Test Scores in Mr. E's Class

Score	Number of Students
77	2
78	1
79	0
80	4
81	2
82	2
83	5
84	3
85	4
86	2
87	0
88	0
89	3

- On a separate sheet of paper, make a dot plot of the test scores in Mr. E's class, using the data in the chart to the right.
- What is the mode, or most common, test score?
- What is the average test score of Mr. E's class? Round your answer to the nearest whole number.

CHECK YOUR UNDERSTANDING:

Want help

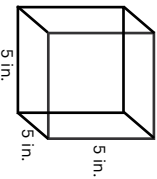
Need practice

Almost there

Got it!

Problem of the Day

Try one of these quick exercises each day as a fast, fun way to start your math lesson! Round answers to the nearest whole number, unless otherwise asked.

<p>DAY 1</p> <p>You have $\frac{5}{8}$ of a pizza in the refrigerator. You eat half of it and save the other half for tomorrow. How much of the pizza will you have left?</p>	<p>DAY 2</p> <p>About 60% of the human body is water. If Ali weighs 102 lb, about how many pounds of water is she made up of?</p>	<p>DAY 3</p> <p>Find the surface area.</p> 	<p>DAY 4</p> <p>Adèle penguins can dive as deep as 175 meters. Write an inequality that represents the depth they can dive using the variable d.</p>	<p>DAY 5</p> <p>Zahi is baking chocolate chip cookies. The recipe calls for 350 grams of flour and 200 grams of chocolate chips. Express the ratio of chocolate chips to flour in simplest form.</p>
<p>DAY 6</p> <p>The dots in a dot plot are stacked in a(n) _____.</p> <p>Ⓐ row Ⓒ circle Ⓑ column Ⓓ array</p>	<p>DAY 7</p> <p>Which type of graph would best show the number of students eating lunch at the school cafeteria every half hour between the hours of 10:30 a.m. and 1:00 p.m.? Explain.</p>	<p>DAY 8</p> <p>The 1998 Doctor Dolittle movie cost \$71,500,000 to produce. The film grossed \$294,156,605 worldwide. How much profit did the movie make?</p>	<p>DAY 9</p> <p>The Winter Youth Olympics begins on January 9 in Switzerland. When deciding on the location, 71 judges voted for Switzerland and 10 voted for Romania. What percent voted for Switzerland?</p>	<p>DAY 10</p> <p>Neha arrives at a New Year's celebration at 9:02 p.m. She stays until half an hour past midnight. How long was she at the celebration for?</p>
<p>DAY 11</p> <p>Many birds fly in a triangle formation to reduce wind resistance. A flock of geese form a triangle shape with angles measuring 62° and 54°. What is the measure of the third angle?</p>	<p>DAY 12</p> <p>The year 2020 is made up of a repeating number. How many years ago was the last time that happened?</p>	<p>DAY 13</p> <p>What number, other than 4 and 36, is a multiple of 4 and a factor of 36?</p>	<p>DAY 14</p> <p>Tania has 6 pairs of socks. Of those pairs, 2 are red, 2 are blue, 1 is black, and 1 is white. If she randomly pulls a pair out of her drawer, what is the probability it won't be blue?</p>	<p>DAY 15</p> <p>What is the slope of a line with coordinates (5, 3) and (4, 1)?</p>
<p>DAY 16</p> <p>You paid \$30 for a dress you've worn twice and \$75 for a sweater you've worn 6 times. Which has the lower cost per wear?</p>	<p>DAY 17</p> <p>Which 2-D shape will you get if you slice a baseball in half?</p> <p>Ⓐ oval Ⓒ triangle Ⓑ rectangle Ⓓ circle</p>	<p>DAY 18</p> <p>Which is greater?</p> <p>5.2×10^6 or 53×10^5</p>	<p>DAY 19</p> <p>Solve for x in the proportion. Round your answer to the nearest hundredth.</p> $\frac{8}{x} = \frac{412}{17}$	<p>DAY 20</p> <p>January 20 is Martin Luther King Jr. Day. The Montgomery bus boycott, in which King played a key role, lasted for 381 days. How many years is that, rounded to the nearest thousandth?</p>