



5th Grade

Enrichment Booklet

Chapters 7, 8, 9, and 10

Chapter

7

Enrichment

Line Plots and the Coordinate Plane



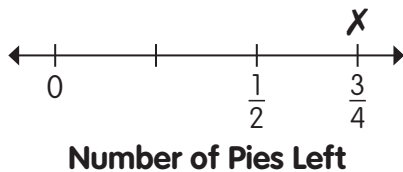
Activity 1 Making and Interpreting Line Plots

Solve. Show your work.

- 1 The table and line plot show the number of pies left in a bakery shop after each day of a week with some missing data.

Number of Pies Left	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Number of Days	2		1	1

Each \times represents 1 day.



- Complete the table and line plot.
- If all the pies left in the week were distributed evenly across all days, how many pies were left each day?

- 2 Timothy recorded the amount of snowfall to the nearest tenth of an inch each day. The table shows the results in 9 days.

Snowfall (inches)	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{3}{10}$	$\frac{1}{2}$	$\frac{7}{10}$
Number of days	2	1	3	2	1

- a Use the data to make a line plot.
- b Timothy made a mistake with the fraction $\frac{1}{2}$ in the table. He corrected the fraction and found the total amount of snowfall in 9 days to be about $2\frac{4}{5}$ inches. What was the correct fraction in simplest form?

- 3 Mr Morris sells bags of mixed nuts in four sizes of different weights. He records the number of bags of mixed nuts sold during lunch hour in a table.

Weight of Bag (lb)	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Number of Bags Sold	6	3	2	4

- a Use the data to make a line plot.
- b Compare the total weight sold for each type of bag to find which type of bag has the greatest total weight.
- c What fraction of the total weight of all bags sold is the total weight of the type of bag sold that has the greatest total weight?



Chapter

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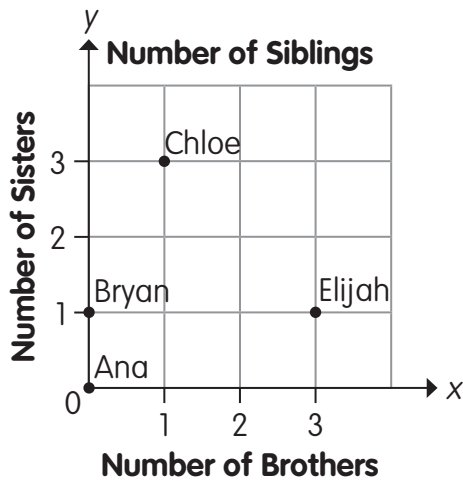
Enrichment

Line Plots and the Coordinate Plane

Activity 2 Graphing on a Coordinate Plane

Solve. Show your work.

- 1 5 pupils were asked about the number of their siblings. The points show the number of their brothers and sisters.

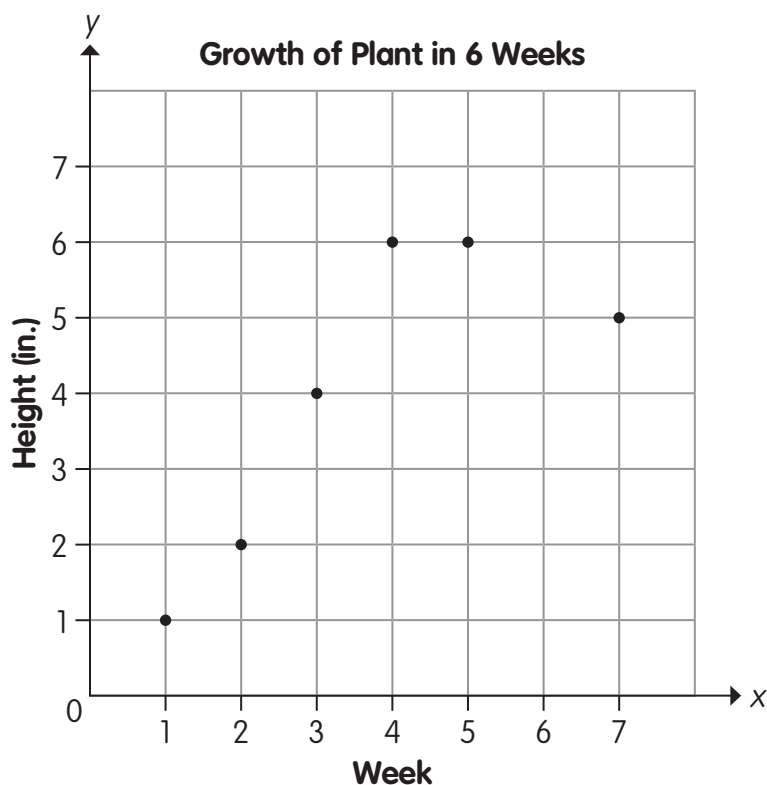


- a Dara has two brothers and no sisters. Plot this point on the coordinate plane.
- b How many more brothers does Elijah have than Chloe?
- c If a vertical line can be drawn to connect two points, what can you say about the number of brothers and sisters the two pupils have?
- d If a horizontal line can be drawn to connect two points, what can you say about the number of brothers and sisters the two pupils have?

- 2 A group of pupils studied the growth of a plant and recorded its height for a period of 6 weeks.

Week	0	1	2	3	4	5	6
Height (in.)	0	1	2	4	6	7	5

One of the pupils, Sean, plotted the data from the table on a graph as follows.



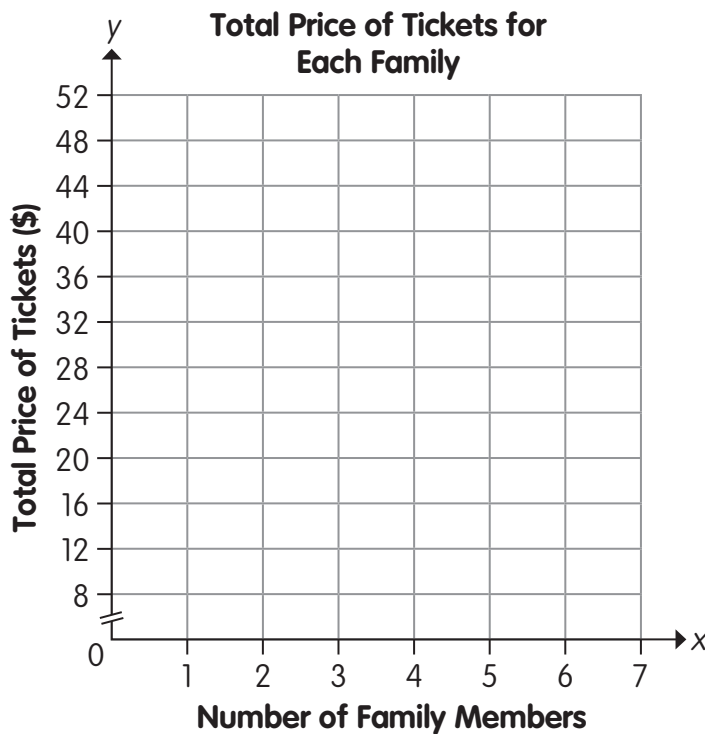
- Identify Sean's mistakes by crossing out the incorrect points and plotting the correct points. Then, join the points without crosses to make a line graph.
- What could be a possible reason for the decrease in height after week 5?

3 A movie theater sells movie tickets at \$10 each. On Family Day, each family is given a discount of \$2 for each ticket after the second, and a further discount of \$2 for each ticket after the fourth.

a Fill in each blank in the ordered pairs below, where the x -coordinate represents the number of family members and the y -coordinate represents the total price of the tickets in dollars.

(_____, 10), (2, _____), (3, _____), (4, _____),
(5, _____), (6, _____)

b Use the ordered pairs in a to make a line graph.



c Mr. Hall paid \$42 to watch a movie with his family on Family Day. How many family members are there in the Hall family?



Chapter

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Enrichment

Line Plots and the Coordinate Plane

Activity 3 Number Patterns and Graphs

Solve. Show your work.

1 Pattern A and Pattern B are number patterns with the following rules.

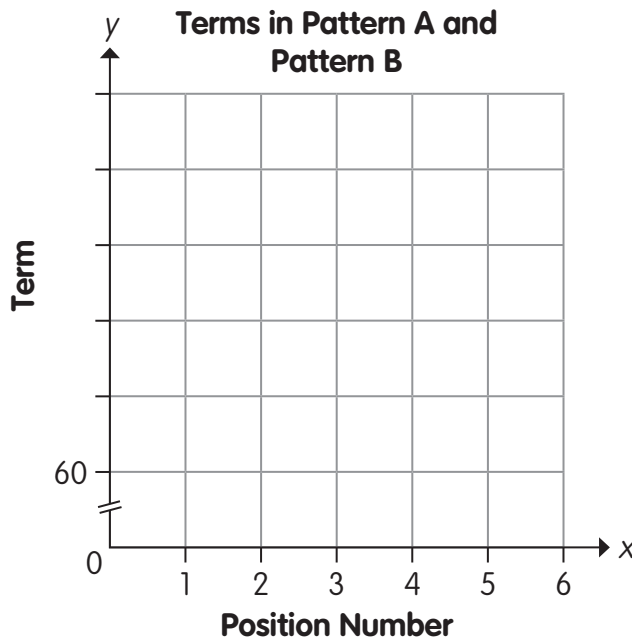
- 3 is added to each term to get the next term in Pattern A.
- 3 is subtracted from each term to get the next term in Pattern B.

a Complete the first five terms for each number pattern.

Pattern A: _____, _____, 66, _____, _____ ...

Pattern B: _____, _____, _____, 63, _____ ...

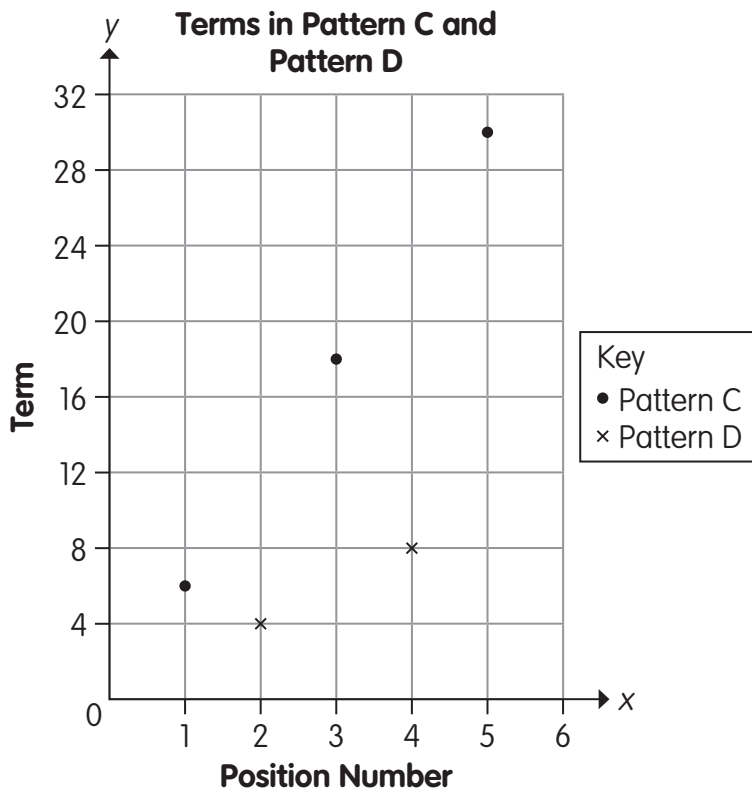
b Graph each number pattern on the same coordinate grid. Use intervals of 3 on the vertical scale.



c For each value of x from 1 to 5, what can you say about the sum of the two y -values for the two patterns?

d How would the line graph of the sum found in c for each value of x look like in the coordinate plane?

2 Some sets of ordered pairs for number patterns C and D are plotted on the coordinate plane below. It is known that each term of Pattern C is 3 times the corresponding term in Pattern D.

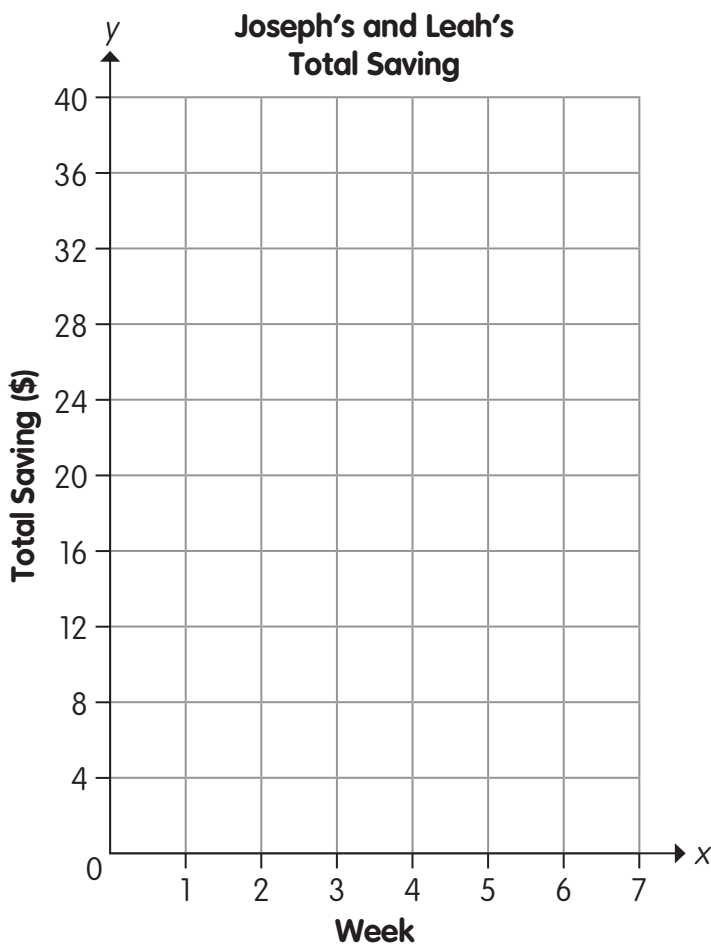


- a Find the first 5 terms in each number pattern.
- b Plot the remaining points of each number pattern on the coordinate plane. Then, join the points for each number pattern to form two straight lines.
- c Write down the rule for each number pattern.

3 Joseph and Leah start saving on Week 1. Joseph saves \$4 every week and Leah saves \$6 every week.

- a Use a rule to record each pupil's total saving for the first four weeks in the table below. Then, plot each point on a coordinate plane and make a line graph.

Week	1	2	3	4
Joseph's Total Saving (\$)				
Leah's Total Saving (\$)				



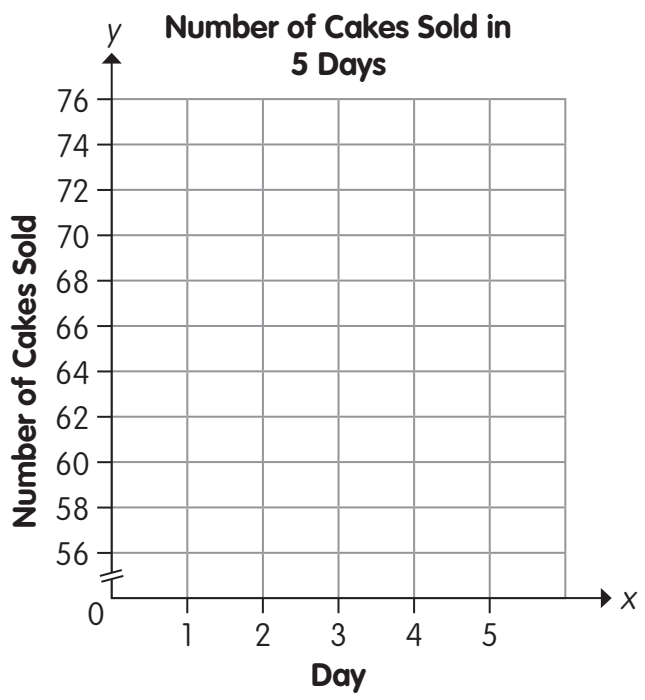
- b By extending the line graphs you have drawn, find how much more Joseph saves than Leah after six weeks.

Mathematical Habit 1 Persevere in solving problems

1 Ms. Cambell records the number of cakes sold in five days and makes the following observations.

- The number of cakes sold on Day 1 was the same as that on Day 5.
 - The number of cakes sold increased from Day 2 to Day 3 and then decreased from Day 3 to Day 4.
 - 8 more cakes were sold on Day 2 than on Day 1.
 - 6 fewer cakes were sold on Day 5 than on Day 4.
 - The greatest number of cakes sold in a day was 74.
 - The difference between the greatest and least number of cakes sold was 16.
- a Write down the five ordered pairs where the x -coordinate represents the day and the y -coordinate represents the number of cakes sold. Explain your reasoning.

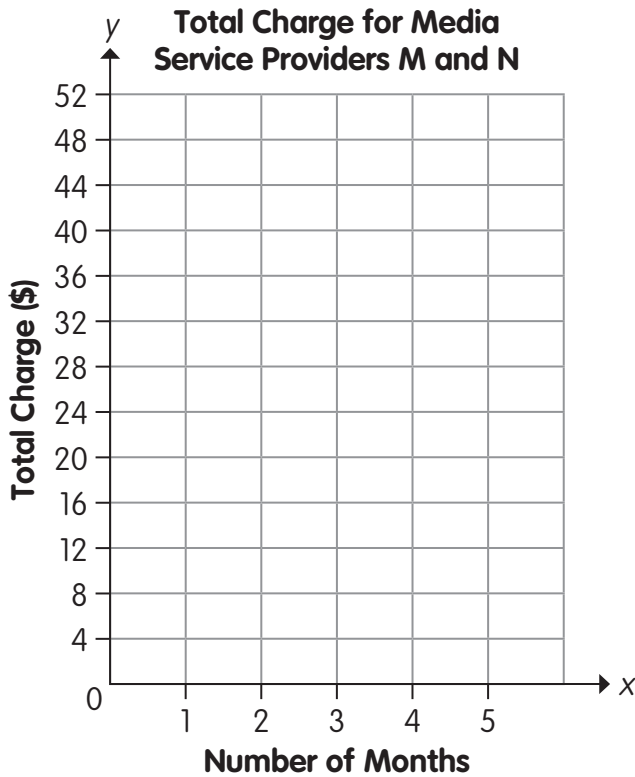
b Use the ordered pairs in a to make a line graph.



Mathematical Habit 8 Look for patterns

- 2 Media service provider M charges \$24 for the first month, then \$4 for each subsequent month of subscription. Media service provider N charges \$10 for each month of subscription.
- a Complete each number pattern to find the total charge for each media service provider after a number of months. Then, plot each point on a coordinate plane and make a line graph for each media service provider.

Number of Months of Subscription	1	2	3	4	5
Total Charge for M (\$)					
Total Charge for N (\$)					



- b** Ms. White is a sales person for media service provider M. She wrote a report to compare her company's charges against its competitor media service provider N's charges based on the data. Find each missing value in her report.

The total charge for media service provider N is less than that for media service provider M if the number of months is _____ or less.

The total charge for media service provider M is less than that for media service provider N if the number of months is _____ or more.

From the graph, each term in N is _____ times the value of _____ less than each term in M.

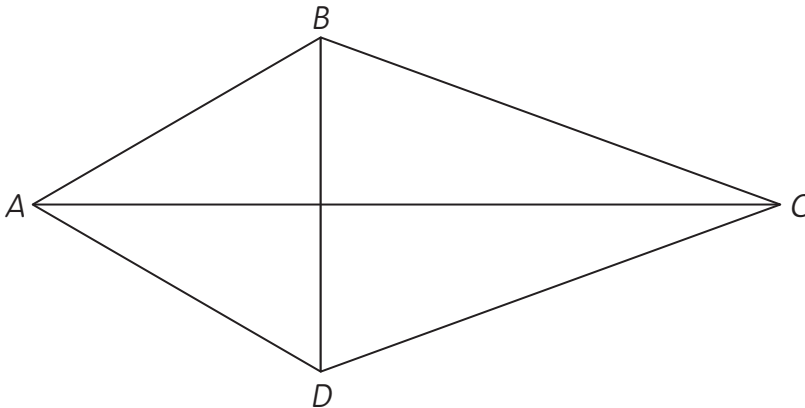
Enrichment Polygons



Activity 1 Classifying Triangles

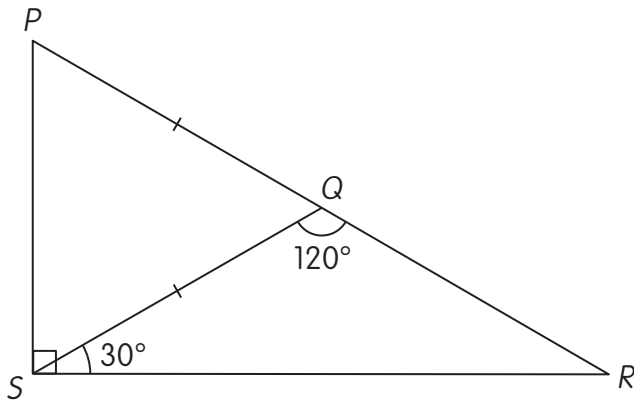
Solve. Show your work. The diagrams may not be drawn to scale.

- 1 In figure $ABCD$, \overline{AC} is a line of symmetry. \overline{AB} and \overline{BD} have equal lengths. \overline{BC} is longer than \overline{AB} .



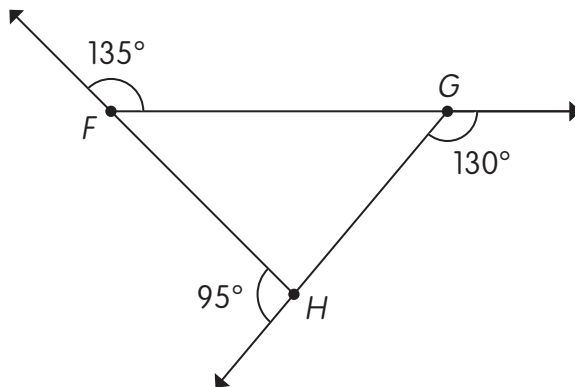
Name an isosceles triangle, an equilateral triangle, and a scalene triangle in figure. Explain your reasoning.

- 2 Triangle PRS is a right triangle. The measure of $\angle QSR$ is 30° and the measure of $\angle RQS$ is 120° . The lengths of \overline{PQ} and \overline{QS} are the same.

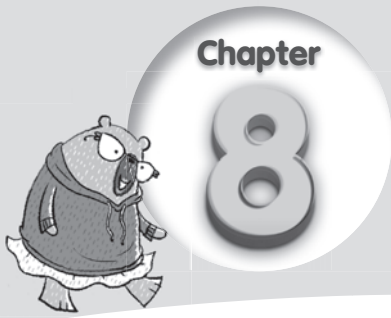


Without measuring, explain why triangle PQS is an equilateral triangle.

- 3 The lines \overrightarrow{FG} , \overrightarrow{GH} , and \overrightarrow{HF} form triangle FGH .



Without measuring, classify triangle FGH in as many ways as possible. Explain your reasoning.



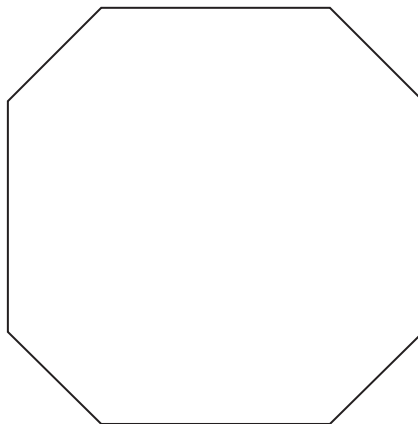
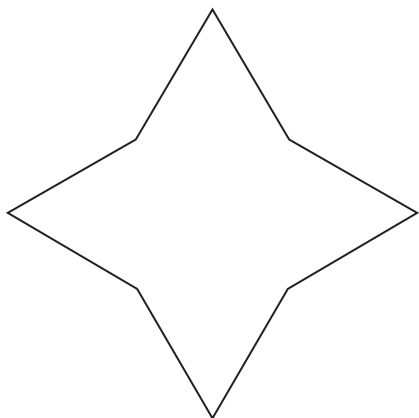
Enrichment Polygons

Activity 2 Classifying Polygons

Solve. Show your work.

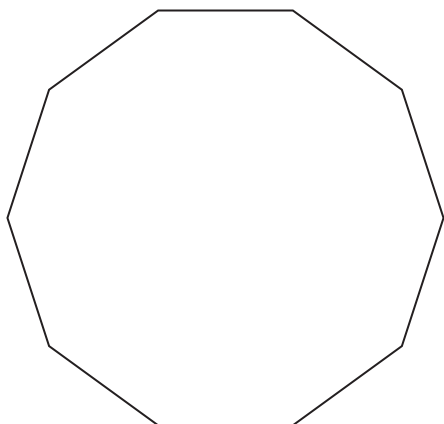
- 1 Is it possible for each of the following polygons to have exactly one right angle? Explain your reasoning. Draw the polygon if it is possible.
 - a A square
 - b A triangle
 - c A parallelogram
 - d A trapezoid

- 2 Two polygons are shown below.



Mariah says that both polygons are regular octagons. Is she correct? Explain your reasoning. Give the correct name for each polygon if she is incorrect.

- 3 The figure shows a polygon.

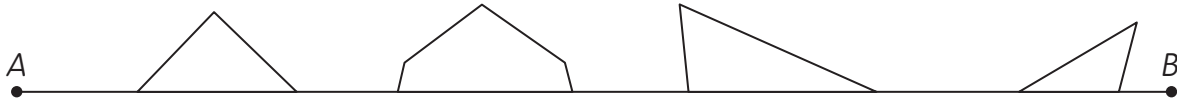


- a Name the polygon. Identify whether it is a regular polygon.
- b In the polygon above, draw straight lines to connect the vertices such that the polygon can be divided into an isosceles triangle, a scalene triangle, a trapezoid, and a hexagon.

Name: _____ Date: _____

Mathematical Habit 2 Use mathematical reasoning

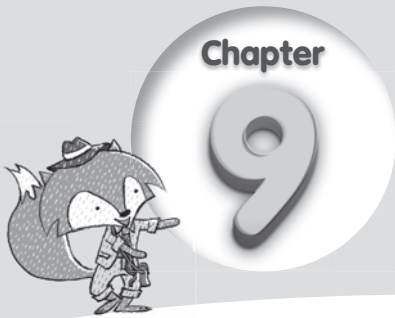
- 1 Evan drew an equilateral triangle, a kite, a rectangle, and a heptagon on a piece of paper. He folded the paper along the line \overline{AB} to cover part of the polygons as shown below.



- a Identify each polygon. Then, complete and label each of them with a possible shape.
- b Explain how you arrived at your answer.

Mathematical Habit 8 Look for patterns

- 2 a** Draw a quadrilateral, a pentagon, and a hexagon. Measure each angle in each polygon. Then, find the sum of the angle measures in each polygon to the nearest ten degrees.
- b** What pattern do you notice about the sum of angle measures in each polygon?
- c** Predict the sum of angle measures in a nonagon.



Enrichment Ratio

Activity 1 Finding Ratios

Each of the following statements is incorrect. Rewrite each statement by changing only one value to make the statement correct.

- 1 a A pencil case contains 8 red pens and blue pens in all. A possible ratio of the number of blue pens to the number of red pens is 2 : 5.

- b A ruler is 17 centimeters long. A roll of fabric is 23 meters long. The ratio of the length of the ruler to the length of the roll of fabric is 17 : 23.

- c A card album can hold 4 cards on each page. Lily fills 1 page with 4 basketball cards and 4 pages with 16 baseball cards. The ratio of the number of basketball cards to the number of baseball cards is 16 : 4.

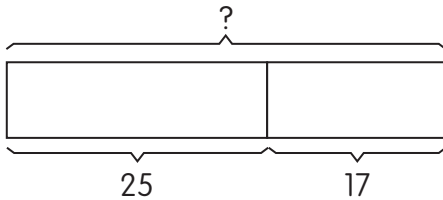
- d Isaac collects as many dimes as nickels. He packs all the dimes into 1 bag and all the nickels evenly into 2 bags. The ratio of the number of dimes to the number of nickels Isaac has is 1 : 2.

Solve. Show your work.

2 Sergio was given the following problem:

There are 25 cookies in a jar. 17 of them are oatmeal cookies and the rest are banana cookies. What is the ratio of the number of banana cookies to the number of oatmeal cookies in the jar?

Sergio solved it as follows.



$$25 + 17 = 42$$

There are 42 banana cookies in the jar.

The ratio of the number of banana cookies to the number of oatmeal cookies in the jar is 42 : 25.

a What possible mistakes did Sergio make?

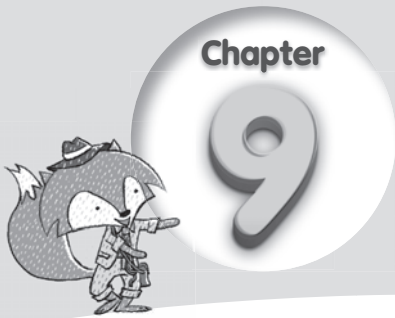
b Show the correct solution to the problem below.

3 Victor downloads 36 English songs and 24 Spanish songs. He saves all his songs in playlists and uses the following rules.

- The number of songs in each playlist is the same.
 - Each playlist can only have songs that have the same language.
 - Each song cannot be repeated in another playlist.
- a** Victor saves 4 songs in each playlist. Find the ratio of the number of English songs to the number of Spanish songs such that the sum of the terms in the ratio is equal to the number of playlists. Explain your reasoning.

b If he saves 6 songs in each playlist instead, what will be the ratio of the number of English songs to the number of Spanish songs such that the sum of the terms in the ratio is equal to the number of playlists?

c Can the ratio of the number of English songs to the number of Spanish songs be 3 : 2? Explain your reasoning.



Enrichment Ratio

Activity 2 Equivalent Ratios

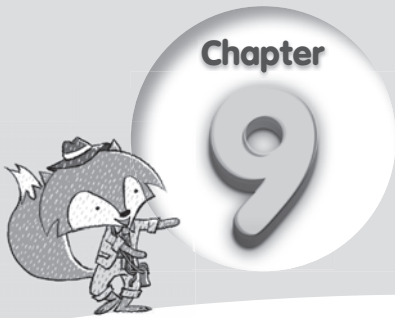
Solve. Show your work.

- 1 List the steps you use to find each missing term.

$$3 : 8 = \underline{\hspace{2cm}} : 32 = 27 : \underline{\hspace{2cm}}$$

- 2 Use two different mathematical operations to find two equivalent ratios of $35 : 56$. Which of these ratios is in simplest form? Explain your reasoning.

- 3 The ratio of the number of paper clips to the number of binders in a box is $12 : 15$. The total number of paper clips and binders is less than 60. List all the possible pairs of paper clips and binders.



Enrichment Ratio

Activity 3 Comparing Three Quantities

Solve. Show your work.

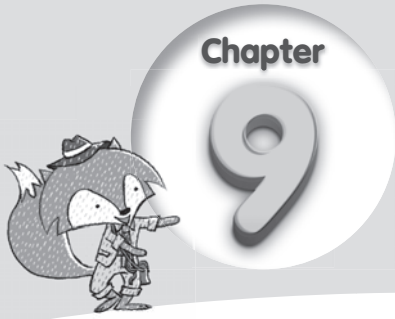
- 1 Jade says that the ratios $6 : 12 : 9$ and $4 : 8 : 6$ are not equivalent because each term in the first ratio cannot be divided by a whole number to get the corresponding term in the second ratio. Do you agree? Explain.

- 2 The ratio of the number of knives to the number of spoons to the number of forks in a drawer is $3 : 4 : 6$. One of the pieces of silverware has a quantity of 12. Find all possible combinations of the pieces of silverware.

3 Zane was told that the ages of Adam, Bailey, and Camila are in the ratio $3 : 6 : 9$. To calculate the ratio of their ages after three years, Zane added 3 to each term in the ratio to get $6 : 9 : 12$.

a Give an example to show his method to calculate the ratio of their ages after three years is incorrect.

b Is it possible for the ratio of their ages after three year to be $6 : 9 : 12$? Explain your reasoning.



Enrichment Ratio

Activity 4 Real-World Problems: Ratio

Solve. Show your work.

- 1 On a weekday, a museum collected \$8,000 from the sale of admission tickets. The ratio of the price of an adult admission ticket to the price of a child admission ticket is 2 : 1. The ratio of the number of adults to the number of children who visited the museum is 3 : 2.
 - a Explain why the ratio of the amount collected from the sale adult tickets to the amount collected from the sale of child tickets is 3 : 1.

 - b Find the amount collected from the sale adult admission tickets.


- 3 Tristan was given the following problem:

Class A and Class B have the same number of pupils. The ratio of the number of girls to the number of boys in Class A is 7 : 5. The ratio of the number of girls to the number of boys in Class B is 1 : 2. All pupils from both classes go on a field trip together. Find the ratio of the total number of girls to the total number of boys.

He drew a bar model for each class as follows.


Class A

girls 

boys 

Class B

girls 

boys 

- a Explain how Tristan arrived at the model for Class B.
- b Does each unit in both models represent the same number of pupils? Explain your reasoning.
- c Use Tristan's bar models to solve the problem.

Name: _____ Date: _____

Mathematical Habit 2 Use mathematical reasoning

Solve. Show your work.

1 In a fruit stall on a Monday morning, the ratio of the number of pears to the number of oranges is 1 : 4. The ratio of the number of oranges to the number of apples is 6 : 5.

a Vanessa writes down how she finds the ratio of the number of pears to the number of oranges to the number of apples. Fill in each blank to complete her work.

_____ is the common fruit in the two ratios. The terms that represent its quantity are 4 and 6.

$4 \times \underline{\hspace{2cm}} = 12$

$6 \times \underline{\hspace{2cm}} = 12$

12 is a common multiple of 4 and 6.

The ratio of the number of pears to the number of oranges

is _____ : 12.

The ratio of the number oranges to the number of apples

is 12 : _____.

For every 12 oranges, there are _____ pears and _____ apples.

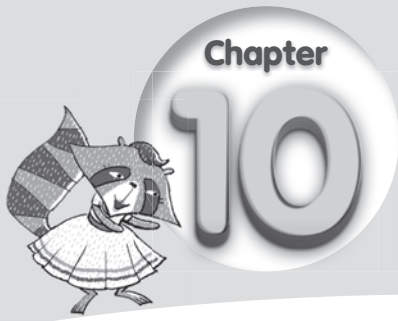
So, the ratio of the number of pears to the number of oranges to the

number apples is _____ : 12 : _____.

- b** On Tuesday morning, the ratio of the number of pears to the number of oranges becomes $1 : 6$. The ratio of the number of oranges to the number of apples becomes $9 : 7$. Use Vanessa's method in **a** to find the ratio of the number of pears to the number of oranges to the number apples on Tuesday morning.

Mathematical Habit 1 Persevere in solving problems

- 2** Concrete is made by mixing gravel, sand, and cement in the ratio $3 : 2 : 1$. Mr. Harris has 18 cubic meters of gravel, 8 cubic meters of sand, and 5 cubic meters of cement. What is the greatest combined volume of the three materials he can use to make concrete?

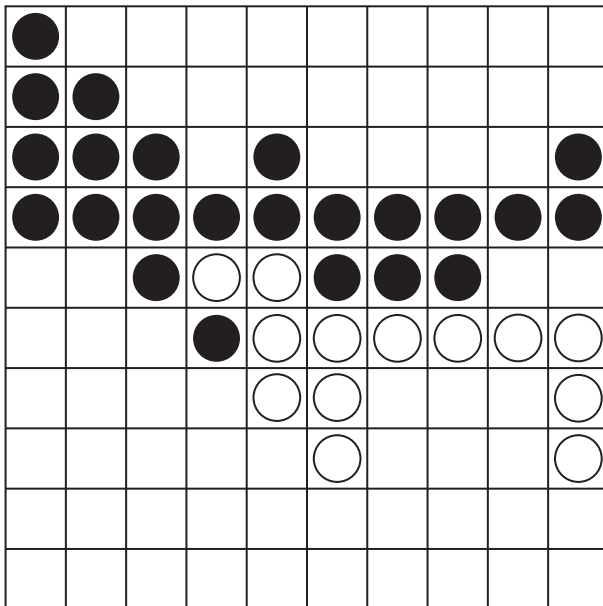


Enrichment Percent

Activity 1 Percent

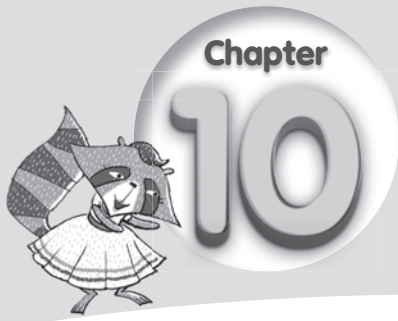
Solve. Show your work.

- 1 Black and white counters are placed on a 100-square grid board as shown below.



- a What percent of the square grids have black counters?
- b What percent of the square grids have white counters?
- c Without counting, calculate the percent of square grids that do not have counters.

- 2 A fruit distributor has 36 kilograms of mangoes, 24 kilograms of apples, 15 kilograms of bananas, and 25 kilograms of grapes. Express the total mass of apples and bananas as a percent of the total mass of the fruit he has.
- 3 Xavier has 1 meter of ribbon. He cuts 62 centimeters of ribbon to tie a present and 12 centimeters to make a pin. Find the percent of ribbon he has left.



Enrichment Percent

Activity 2 Fractions, Decimals, and Percents

Match each percent to a fraction and a decimal with the same value.

1 $\frac{3}{5}$ • • 84% • • 0.48

$\frac{21}{25}$ • • 95% • • 0.6

$\frac{3}{4}$ • • 48% • • 0.84

$\frac{19}{20}$ • • 60% • • 0.06

$\frac{3}{50}$ • • 75% • • 0.95

$\frac{12}{25}$ • • 6% • • 0.75

Solve. Show your work.

- 2 Julia was given the following problem:
Express 8% as a decimal and a fraction in simplest form.
She solved it as follows.

$$\begin{aligned}8\% &= \frac{8}{100} \\ &= 0.8\end{aligned}$$

$$\begin{aligned}8\% &= \frac{8}{100} \div 2 \\ &= \frac{4}{50}\end{aligned}$$

8% is 0.8 as decimal and $\frac{4}{50}$ as a fraction in simplest form.

- a What possible mistakes did she make?

- b Show the correct solution to the problem below.

3 Express each fraction as a percent by multiplying by 100%.

a $\frac{7}{8}$

b $\frac{19}{40}$

c Avery makes the following observation about proper fractions with denominators 8 and 40. Complete her work by filling in each blank with a decimal.

$$100 \div 8 = \underline{\hspace{2cm}}$$

To express a proper fraction with denominator 8 as a percent, multiply the numerator and denominator by $\underline{\hspace{2cm}}$.

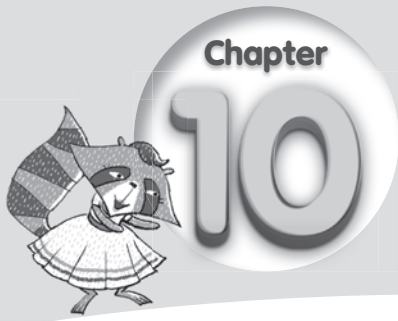
$$100 \div 40 = \underline{\hspace{2cm}}$$

To express a proper fraction with denominator 40 as a percent, multiply the numerator and denominator by $\underline{\hspace{2cm}}$.

Use Avery's observation to express each fraction as a percent.

d $\frac{5}{8}$

e $\frac{37}{40}$



Enrichment Percent

Activity 3 Percent of a Quantity

Fill in each blank. Show your work.

1 75% of 176 has the same value as _____% of 264.

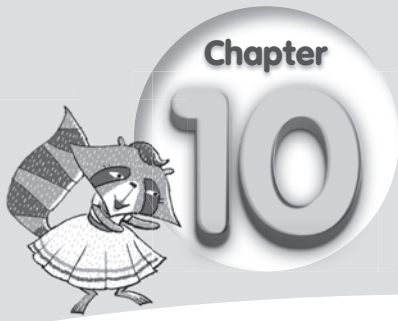
2 30% of 2,740 has the same value as 20% of _____.

3 25% of _____ has the same value as 40% of 1,780.

4 28% of 0.185 kilogram is _____ grams.

5 85% of 960 milliliters is _____ liter.

6 20% of _____ meters is 0.376 kilometer.

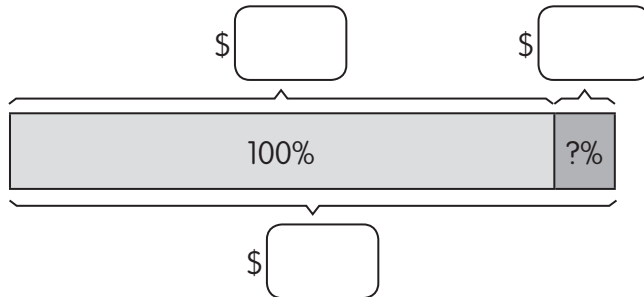


Chapter 10 Enrichment Percent

Activity 4 Real-World Problems: Percent

Fill in each blank in the bar model. Then, solve the problem.

- The Clean and Green Society has \$13,500 deposited in a bank at the beginning of the year. At the end of the year, the amount increases to \$14,040. What is the percent interest the bank pays?



Solve. Draw a bar model to help you.

- 2 Hayden is browsing two online retail stores, Store A and Store B. Both stores are selling the same shirt that he wants to buy. The shirt costs \$34 in Store A before a discount of 15% and \$36 in Store B before a discount of 20%. Which store should Hayden buy the shirt from if he wants to save more? Explain your reasoning.

- 3 Ms. Wright looks at the menu in a restaurant. She wants to order a bowl of salad priced at \$13.10 and a glass of fruit juice priced at \$5.90. There is a 5% sales tax and a 3% meals tax on all food and beverages. Is she able to pay for her meal with \$20? Explain your reasoning.

Name: _____ Date: _____

Mathematical Habit 4 Use mathematical models

- 1 Three candidates ran for an election. One candidate received 30% of the votes. The remaining votes were split between the other two candidates in the ratio 2 : 5. The candidate who had the most votes received 58 more votes than the candidate who had the second-highest number of votes. How many votes were casted?

Mathematical Habit 4 Use mathematical models

- 2 The figure below is not drawn to scale. It is made up of identical triangles A and B, identical triangles C and D, triangle E, parallelogram F, and square G. The ratio of the area of triangle A to the area of triangle C to the area of triangle E is 4 : 1 : 2. The areas of parallelogram F and square G are the same. The area of E is $\frac{1}{8}$ of the area of the whole figure. What percent of the figure is square G?

