Max’s family takes the train to visit the city zoo. Use the RDW process to solve the problems about Max’s trip to the zoo. Use a letter to represent the unknown in each problem.

1. The sign below shows information about the train schedule into the city.

   **Train Fare—One Way**
   
   Adult: $8
   
   Child: $6
   
   Leaves every 15 minutes starting at 6:00 a.m.

   a. Max’s family buys 2 adult tickets and 3 child tickets. How much does it cost Max’s family to take the train into the city?

   \[ n = \frac{160 + 18}{34} \]
   
   \[ n = 34 \]

   It costs Max’s family $34 to take the train.

   b. Max’s father pays for the tickets with $10 bills. He receives $6 in change. How many $10 bills does Max’s father use to pay for the train tickets?

   \[ n = \frac{400}{10} \]
   
   \[ n = 4 \]

   Max’s father uses 4 $10 bills to pay for the train tickets.

   c. Max’s family wants to take the fourth train of the day. It’s 6:38 a.m. now. How many minutes do they have to wait for the fourth train?

   \[ n = 45 - 38 \]
   
   \[ n = 7 \]

   They have to wait 7 minutes.
2. At the city zoo, they see 17 young bats and 19 adult bats. The bats are placed equally into 4 areas. How many bats are in each area?

\[ \frac{17 + 19}{4} = \frac{36}{4} = 9 \]

There are 9 bats in each area.

3. Max’s father gives the cashier $20 to pay for 6 water bottles. The cashier gives him $8 in change. How much does each water bottle cost?

\[ \frac{20}{8} = \frac{12}{6} \]

Each water bottle costs $2.

4. The zoo has 112 types of reptiles and amphibians in their exhibits. There are 72 types of reptiles, and the rest are amphibians. How many more types of reptiles are there than amphibians in the exhibits?

\[ 112 - 72 = 40 \]

There are 32 more reptiles than amphibians.
Name ____________________________  Date ________________

Use the RDW process to solve. Use a letter to represent the unknown in each problem.

1. A box containing 3 small bags of flour weighs 950 grams. Each bag of flour weighs 300 grams. How much does the empty box weigh?

\[
\begin{align*}
\text{bag} & : 1 \quad 2 \quad 3 \\
\text{300g} & \quad \text{300g} \quad \text{300g} \\
\end{align*}
\]

\[
\begin{align*}
950g & \\
900g & \\
\text{n} & \\
\end{align*}
\]

\[
\begin{align*}
950g - 900g & = n \\
50g & = n \\
\end{align*}
\]

The empty box weighs 50g.

2. Mr. Cullen needs 91 carpet squares. He has 49 carpet squares. If the squares are sold in boxes of 6, how many more boxes of carpet squares does Mr. Cullen need to buy?

\[
\begin{align*}
| & 91 \\
\text{49} & \\
\end{align*}
\]

\[
\begin{align*}
\frac{91}{49} & = 1 \\
\frac{42}{42} & = 1 \\
\end{align*}
\]

Needs 42 more tiles

\[
\begin{align*}
6 | \begin{array}{c} n \\ \text{42 tiles} \end{array} \\
42 \div 6 & = 7 \text{ boxes} \\
\end{align*}
\]

Mr. Cullen needs to buy 7 more boxes of tiles.

3. Erica makes a banner using 4 sheets of paper. Each paper measures 9 inches by 10 inches. What is the total area of Erica’s banner?

\[
\begin{align*}
9\text{in.} \\
10\text{in.} \\
\text{Area} = 9\text{in} \times 10\text{in} \\
\text{Area} = 90 \text{ sq. in. for one banner} \\
\end{align*}
\]

\[
\begin{align*}
\begin{array}{c}
\text{90} \\
\text{90} \\
\text{90} \\
\text{90} \\
\end{array} \\
4 \text{ banners} \\
\text{n} = 90 \times 4 \\
\text{n} = 360 \\
\end{align*}
\]

The total area of the 4 banner is 360 sq. in.
4. Monica scored 32 points for her team at the Science Bowl. She got 5 four-point questions correct, and the rest of her points came from answering three-point questions. How many three-point questions did she get correct?

\[
\begin{array}{|c|c|}
\hline
\text{4} & \text{4} \\
\text{4} & \text{4} \\
\hline
\end{array}
\quad
\begin{array}{|c|c|}
\hline
\text{32 points} & \text{32} \\
\text{20} & \text{20} \\
\hline
\end{array}
\quad
\begin{array}{|c|c|}
\hline
\text{3} & \ldots & \text{3} \\
\hline
\end{array}
\]

\[5 \times 4 = 20 \text{ points}\]

\[32 - 20 = 12 \text{ points}\]

\[n = 12 \div 3\]
\[n = 4\]

She got 4 three-point questions correct.

5. Kim's black kitten weighs 175 grams. Her gray kitten weighs 43 grams less than the black kitten. What is the total weight of the two kittens?

\[
\begin{array}{|c|c|}
\hline
\text{black} & \text{gray} \\
\text{kitten} & \text{kitten} \\
\hline
175g & 132g \\
\hline
43g & \text{less} \\
\hline
\end{array}
\]

\[\frac{175}{43} = 132g\]

\[175g + 132g = 307g\]

The two kittens weigh 307g.

6. Cassia and Javier's combined height is 267 centimeters. Cassia is 128 centimeters tall. How much taller is Javier than Cassia?

\[
\begin{array}{|c|c|}
\hline
\text{267cm both} & \text{128cm Cassia} \\
\hline
\text{? cm} & \text{? cm Javier} \\
\hline
\end{array}
\]

\[\frac{267 - 128}{139} \text{ cm}\]

\[n = 139 - 128\]
\[n = 11\]

Javier is 11 cm taller than Cassia.
Use the RDW process to solve the problems below. Use a letter to represent the unknown in each problem.

1. Jerry pours 86 milliliters of water into 8 tiny beakers. He measures an equal amount of water into the first 7 beakers. He pours the remaining water into the eighth beaker. It measures 16 milliliters. How many milliliters of water are in each of the first 7 beakers?

   \[
   \begin{array}{c}
   \text{86 mL total} \\
   \hline
   \text{16 mL} \\
   \text{7 \text{ beakers}} \\
   \hline
   \text{? \text{ other beakers}} \\
   \hline
   \text{86} - \frac{16}{7} = 10 \text{ mL}
   \end{array}
   \]

   There are 10 mL of water in each of the first 7 beakers.

2. Mr. Chavez’s third-graders go to gym class at 11:15. Students rotate through three activities for 8 minutes each. Lunch begins at 12:00. How many minutes are there between the end of gym activities and the beginning of lunch?

   \[
   \begin{array}{c}
   \text{Activity 1} 8 \text{ min.} \\
   11:15 \\
   \hline
   \text{Activity 2} 8 \text{ min.} \\
   11:23 \\
   \hline
   \text{Activity 3} 8 \text{ min.} \\
   11:31 \\
   \hline
   \text{n} \\
   11:39 \\
   \hline
   \text{12:00} \\
   \hline
   \end{array}
   \]

   \[
   \frac{3 - 10}{60} - \frac{39}{21} = n
   \]

   There are 21 minutes between the end of gym and the beginning of lunch.

3. A box contains 100 pens. In each box there are 38 black pens and 42 blue pens. The rest are green pens. Mr. Cane buys 6 boxes of pens. How many green pens does he have in total?

   \[
   \begin{array}{c}
   \text{100 pens} \\
   \hline
   \text{38 black} \\
   \text{42 blue} \\
   \hline
   \text{? green} \\
   \hline
   \frac{38 + 42}{80} = 20 \text{ green pens in 1 box} \\
   \hline
   \text{n} = 6 \times 20 = 120 \text{ green pens}
   \end{array}
   \]

   He has a total of 120 green pens.
4. Greg has $56. Tom has $17 more than Greg. Jason has $8 less than Tom.
   a. How much money does Jason have?

   \[
   \begin{align*}
   \text{Amount} & \quad \text{Description} \\
   \$56 & \quad \text{Greg} \\
   \$17 & \quad \text{more} \\
   \hline
   \$73 & \quad \text{Tom}
   \end{align*}
   \]

   \[
   \begin{align*}
   \text{Amount} & \quad \text{Description} \\
   \$73 & \quad \text{Tom} \\
   \$8 & \quad \text{less} \\
   \hline
   n & \quad \text{n}
   \end{align*}
   \]

   \[
   \begin{align*}
   n = 73 - 8 \\
   n = \$65 & \quad \text{Jason}
   \end{align*}
   \]

   Jason has \$65.

   b. How much money do the 3 boys have in total?

   \[
   \begin{align*}
   \text{Amount} & \quad \text{Description} \\
   \$56 & \quad \text{Greg} \\
   \$65 & \quad \text{Jason} \\
   \$73 & \quad \text{Tom} \\
   \hline
   n & \quad \text{n}
   \end{align*}
   \]

   \[
   \begin{align*}
   n = 56 + 65 + 73 \\
   n = \$194
   \end{align*}
   \]

   The 3 boys have a total of \$194.

5. Laura cuts 64 inches of ribbon into two parts and gives her mom one part. Laura’s part is 28 inches long. Her mom cuts her ribbon into 6 equal pieces. How long is one of her mom’s pieces of ribbon?

   \[
   \begin{align*}
   \text{Amount} & \quad \text{Description} \\
   64 \text{ in.} & \quad \text{Total} \\
   28 \text{ in.} & \quad \text{Laura} \\
   ? & \quad \text{Mom} \\
   \hline
   36 \text{ in.} & \quad \text{Mom}
   \end{align*}
   \]

   \[
   \begin{align*}
   36 \div 6 = 60 \\
   \text{One of her mom’s pieces of ribbon is 6 inches.}
   \end{align*}
   \]
1. Complete the chart by answering true or false.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Polygon</th>
<th>True or False</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: 3 Sides</td>
<td><img src="image1" alt="Triangle" /></td>
<td>True</td>
</tr>
<tr>
<td>4 Sides</td>
<td><img src="image2" alt="Quadrilateral" /></td>
<td>True</td>
</tr>
<tr>
<td>2 Sets of Parallel Sides</td>
<td><img src="image3" alt="Quadrilateral" /></td>
<td>True</td>
</tr>
<tr>
<td>4 Right Angles</td>
<td><img src="image4" alt="Quadrilateral" /></td>
<td>False</td>
</tr>
<tr>
<td>Quadrilateral is a 4 sided polygon</td>
<td><img src="image5" alt="Quadrilateral" /></td>
<td>True</td>
</tr>
</tbody>
</table>
2. a. Each quadrilateral below has at least 1 set of parallel sides. Trace each set of parallel sides with a colored pencil.

b. Using a straightedge, sketch a different quadrilateral with at least 1 set of parallel sides.

There are several correct answers.
1. Match the polygons with their appropriate clouds. A polygon can match to more than 1 cloud.

- **All sides are equal**
- **Hexagon**
- **Regular octagon**
- **Decagon**

- **All sides are not equal**
- **Rectangle**
- **Regular octagon**
- **Decagon**

- **At least 1 right angle**
- **Square**
- **Regular octagon**

- **At least 1 set of parallel sides**
- ** Pentagon**
- **Square**
- **Decagon**
2. The two polygons below are regular polygons. How are these polygons the same? How are they different?

- They are the same because their sides are all straight and of equal length.
- They are different because one has 6 sides and the other one has 3 sides.

3. Lucia drew the polygons below. Are any of the polygons she drew regular polygons? Explain how you know.

No, none of them are regular polygons. I know because to be a regular polygon all sides and angles have to be equal.
* There are more than one possible answers for each problem.

Use a ruler and a right angle tool to help you draw the figures with the given attributes below.

1. Draw a triangle that has no right angles.

   ![Triangle]

2. Draw a quadrilateral that has at least 2 right angles.

   ![Quadrilateral options]

3. Draw a quadrilateral with 2 equal sides. Label the 2 equal side lengths of your shape.

   ![Quadrilateral with labeled sides]
4. Draw a hexagon with at least 2 equal sides. Label the 2 equal side lengths of your shape.

5. Draw a pentagon with at least 2 equal sides. Label the 2 equal side lengths of your shape.

6. Cristina describes her shape. She says it has 3 equal sides that are each 4 centimeters in length. It has no right angles. Do your best to draw Cristina's shape and label the side lengths.
Below are 3 possible rectangles.

1. Color tetrominoes on the grid to create three different rectangles. You may use the same tetromino more than once.
2. Color tetrominoes on the grid below to:
   a. Create a square with an area of 16 square units.
   b. Create at least two different rectangles, each with an area of 24 square units.

You may use the same tetromino more than once.

3. Explain how you know the rectangles you created in Problem 2(b) have the correct area.
1. Draw a line to divide the square below into 2 equal triangles.

![Square with diagonal line]

2. Draw a line to divide the triangle below into 2 equal, smaller triangles.

![Equilateral triangle divided into two triangles]

3. Draw a line to divide the trapezoid below into 2 equal trapezoids.

![Trapezoid with dividing line]
4. Draw 2 lines to divide the quadrilateral below into 4 equal triangles.

5. Draw 4 lines to divide the square below into 8 equal triangles.

6. Describe the steps you took to divide the square in Problem 5 into 8 equal triangles.

First I drew a line from one corner to the opposite corner.
Second I drew another line from the other corners.
Third I drew a vertical from the middle of the top to the middle of the bottom.
Fourth I drew a horizontal line from the middle of both sides.
1. Use at least two tangram pieces to make and draw each of the following shapes. Draw lines to show where the tangram pieces meet.

   a. A triangle.
      ![Triangle Diagram 1]
      ![Triangle Diagram 2]

   b. A square.
      ![Square Diagram]

   c. A parallelogram.
      ![Parallelogram Diagram 1]
      ![Parallelogram Diagram 2]

   d. A trapezoid.
      ![Trapezoid Diagram 1]
      ![Trapezoid Diagram 2]
2. Use your tangram pieces to create the cat below. Draw lines to show where the tangram pieces meet.

3. Use the five smallest tangram pieces to make a square. Sketch your square below, and draw lines to show where the tangram pieces meet.
1. Trace the perimeter of the shapes below.

a. Explain how you know you traced the perimeters of the shapes above.

   I know I traced the perimeters because I traced around the boundary of each shape. The boundary of a shape is its perimeter.

b. Explain how you could use a string to figure out which shape above has the greatest perimeter.

   I could lay a piece of string around each boundary and cut it. Then I could stretch out each piece of string to see which one was the longest.
2. Draw a rectangle on the grid below.

   ![Rectangle Grid]

   a. Trace the perimeter of the rectangle.
   b. Shade the area of the rectangle.
   c. How is the perimeter of the rectangle different from the area of the rectangle?

   *The perimeter is the boundary of the rectangle.*
   *The area is the space inside the rectangle.*

3. Maya draws the shape shown below. Noah colors the inside of Maya’s shape as shown. Noah says he colored the perimeter of Maya’s shape. Maya says Noah colored the area of her shape. Who is right? Explain your answer.

   ![Colored Shape]

   *Maya is right. Noah colored the inside of the shape which is the area. The perimeter is the boundary lines.*
1. Samson tessellates regular hexagons to make the shape below.

   ![](image)

   **tessellation** - a figure made by copying a shape many times.

   a. Outline the perimeter of Samson’s new shape with a highlighter.

   b. Explain how Samson could use a string to measure the perimeter of his new shape.

   Samson could lay a string on the boundary lines all the way around the shape. Then he could take the string and measure it with a ruler.

   c. How many sides does his new shape have? 18 sides

   d. Shade in the area of his new shape with a colored pencil.

2. Estimate to draw at least four copies of the given triangle to make a new shape, without gaps or overlaps.

   Outline the perimeter of your new shape with a highlighter. Shade in the area with a colored pencil.
3. The marks on the strings below show the perimeters of Shyla’s and Frank’s shapes. Whose shape has a greater perimeter? How do you know?

Shyla’s String: 

Frank’s String: 

Frank’s shape has the greater perimeter because his piece of string is longer.

4. India and Theo use the same shape to create the tessellations shown below.

India’s Tessellation

Theo’s Tessellation

a. Estimate to draw the shape India and Theo used to make their tessellations.

b. Theo says both tessellations have the same perimeter. Do you think Theo is right? Why or why not?

Yes, I think Theo is right because they both used 12 of the same triangles to make their tessellation and there are no gaps or overlaps in either.
1. Measure and label the side lengths of the shapes below in centimeters. Then, find the perimeter of each shape.

a. 
\[ \text{Perimeter} = 4 + 5 + 3 \]
\[ = 12 \text{ cm} \]

b. 
\[ \text{Perimeter} = 6 + 4 + 6 + 4 \]
\[ = 20 \text{ cm} \]

c. 
\[ \text{Perimeter} = 5 + 4 + 3 + 4 \]
\[ = 16 \text{ cm} \]

d. 
\[ \text{Perimeter} = 5 + 5 + 5 + 5 \]
\[ = 20 \text{ cm} \]

e. 
\[ \text{Perimeter} = 8 + 3 + 2 + 2 + 4 + 2 + 2 + 3 \]
\[ = 26 \text{ cm} \]
2. Melinda draws two trapezoids to create the hexagon shown below. Use a ruler to find the side lengths of Melinda’s hexagon in centimeters. Then, find the perimeter.

\[ P = 3\text{cm} + 3\text{cm} + 3\text{cm} + 3\text{cm} + 3\text{cm} + 3\text{cm} \]
\[ P = 18\text{ cm} \]

The perimeter of Melinda’s hexagon is 18 cm.

3. Victoria and Eric draw the shapes shown below. Eric says his shape has a greater perimeter because it has more sides than Victoria’s shape. Is Eric right? Explain your answer.

Victoria’s Shape

\[ P = 5\text{cm} + 3\text{cm} + 4\text{cm} \]
\[ P = 12\text{ cm} \]

Eric’s Shape

\[ P = 3\text{cm} + 3\text{cm} + 3\text{cm} + 3\text{cm} \]
\[ P = 12\text{ cm} \]

No, Eric is wrong. Both shapes have a perimeter of 12 cm. I know because I measured the sides and added the lengths.

4. Jamal uses his ruler and a right angle tool to draw the rectangle shown below. He says the perimeter of his rectangle is 32 centimeters. Do you agree with Jamal? Why or why not?

\[ P = 8\text{cm} + 4\text{cm} + 8\text{cm} + 4\text{cm} \]
\[ P = 24\text{ cm} \]

No, I don’t agree with Jamal because I measured the side and added them up and got 24 cm not 32 cm.
1. Find the perimeters of the shapes below. Include the units in your number sentences. Match the letter inside each shape to its perimeter to solve the riddle. The first one has been done for you.

```
Name _____________________________ Date _______________

1. Find the perimeters of the shapes below. Include the units in your number sentences. Match the letter inside each shape to its perimeter to solve the riddle. The first one has been done for you.

   Triangle (q):
   - Sides: 7 in, 7 in, 7 in
   - Perimeter: P = 7 in + 7 in + 7 in = 21 in

   Pentagon (r):
   - Sides: 6 ft, 6 ft, 9 ft, 6 ft, 9 ft
   - Perimeter: P = 6 ft + 6 ft + 9 ft + 6 ft + 9 ft = 36 cm

   Parallelogram (s):
   - Sides: 7 cm, 5 cm, 7 cm, 5 cm
   - Perimeter: P = 7 cm + 5 cm + 7 cm + 5 cm = 24 cm

   Trapezoid (a):
   - Sides: 5 yd, 7 yd, 7 yd, 9 yd
   - Perimeter: P = 5 yd + 7 yd + 7 yd + 9 yd = 28 yd

   Rectangle (m):
   - Sides: 4 in, 4 in, 4 in, 4 in
   - Perimeter: P = 4 in + 4 in + 4 in + 4 in = 16 in

   Rectangle (e):
   - Sides: 8 cm, 8 cm, 5 cm, 5 cm
   - Perimeter: P = 8 cm + 5 cm + 8 cm + 5 cm = 26 cm

   Trapezoid (u):
   - Sides: 7 m, 3 m, 6 m, 4 m
   - Perimeter: P = 7 m + 3 m + 6 m + 3 m = 20 m

   Parallelogram (l):
   - Sides: 4 m, 2 m, 4 m, 2 m
   - Perimeter: P = 4 m + 2 m + 2 m + 4 m + 3 m = 15 m

What kind of meals do math teachers eat?

Square Meals!
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**EUREKA MATH**

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Lesson 13: Explore perimeter as an attribute of plane figures and solve problems.
2. Alicia’s rectangular garden is 33 feet long and 47 feet wide. What is the perimeter of Alicia’s garden?

\[ P = 47\,\text{ft} + 33\,\text{ft} + 47\,\text{ft} + 33\,\text{ft} \]
\[ P = 80\,\text{ft} + 80\,\text{ft} \]
\[ P = 160\,\text{ft}. \]

The perimeter of the garden is 160 ft.

3. Jaques measured the side lengths of the shape below.

a. Find the perimeter of Jaques’ shape.

\[ P = 4\,\text{in} + 5\,\text{in} + 4\,\text{in} + 3\,\text{in} + 7\,\text{in} + 5\,\text{in} + 2\,\text{in} + 3\,\text{in} \]
\[ P = \frac{13\,\text{in}}{10\,\text{in}} + \frac{10\,\text{in}}{10\,\text{in}} \]
\[ P = 33\,\text{in}. \]

b. Jaques says his shape is an octagon. Is he right? Why or why not?

Yes, he is right because his shape has 8 sides and an octagon has 8 sides.
1. Label the unknown side lengths of the regular shapes below. Then, find the perimeter of each shape.

a. 
   
   ![Triangle Diagram]
   
   Perimeter = \( \frac{12}{3 \times 4} = 12 \)

b. 
   
   ![Square Diagram]
   
   Perimeter = \( \frac{32}{4 \times 8} = 32 \)

c. 
   
   ![Octagon Diagram]
   
   Perimeter = \( \frac{72}{8 \times 9} = 72 \)

d. 
   
   ![Hexagon Diagram]
   
   Perimeter = \( \frac{36}{6 \times 6} = 36 \)

2. Label the unknown side lengths of the rectangle below. Then, find the perimeter of the rectangle.

![Rectangle Diagram]

Perimeter = \( 26 \) cm

\[
P = \text{9 cm} + \text{9 cm} + \frac{4 \text{ cm} + 4 \text{ cm}}{18 \text{ cm} + 8 \text{ cm}}
\]

\[
P = 26 \text{ cm}
\]
3. Roxanne draws a regular pentagon and labels a side length as shown below. Find the perimeter of Roxanne’s pentagon.

\[ 5 \times 7 = 35 \]

Roxanne’s pentagon has a perimeter of 35 cm.

4. Each side of a square field measures 24 meters. What is the perimeter of the field?

\[ P = 24m + 24m + 24m + 24m \]
\[ P = \frac{48m}{48m} + \frac{48m}{48m} \]
\[ P = 96m \]

The perimeter of the field is 96 m.

5. What is the perimeter of a rectangular sheet of paper that measures 8 inches by 11 inches?

\[ P = 11\text{in} + 11\text{in} + 8\text{in} + 8\text{in} \]
\[ P = \frac{22\text{in}}{22\text{in}} + \frac{16\text{in}}{16\text{in}} \]
\[ P = 38\text{ in.} \]

The perimeter of the piece of paper is 38 in.
1. Miguel glues a ribbon border around the edges of a 5-inch by 8-inch picture to create a frame. What is the total length of ribbon Miguel uses?

\[
P = 8\text{in} + 8\text{in} + 5\text{in} + 5\text{in}
\]

\[
P = 16\text{in} + 10\text{in}
\]

\[
P = 26\text{in}
\]

The total length of ribbon used is 26 in.

2. A building at Elmira College has a room shaped like a regular octagon. The length of each side of the room is 5 feet. What is the perimeter of this room?

"regular" means all sides are the same length.

An octagon has 8 sides.

8 × 5 = 40

The perimeter of the room is 40 ft.

3. Manny fences in a rectangular area for his dog to play in the backyard. The area measures 35 yards by 45 yards. What is the total length of fence that Manny uses?

\[
P = 45\text{yd} + 45\text{yd} + 35\text{yd} + 35\text{yd}
\]

\[
P = 90\text{yd} + 70\text{yd}
\]

\[
P = 160\text{yd}
\]

Manny uses 160 yards of fence.
4. Tyler uses 6 craft sticks to make a hexagon. Each craft stick is 6 inches long. What is the perimeter of Tyler's hexagon?

\[6 \times 6 = 36\in\]

The perimeter of Tyler's hexagon is 36 inches.

5. Francis made a rectangular path from her driveway to the porch. The width of the path is 2 feet. The length is 28 feet longer than the width. What is the perimeter of the path?

\[P = (30\text{ ft} + 30\text{ ft}) + (2\text{ ft} + 2\text{ ft})\]
\[P = 60\text{ ft} + 4\text{ ft}\]
\[P = 64\text{ ft}\]

The perimeter of the path is 64 ft.

6. The gym teacher uses tape to mark a 4-square court on the gym floor, as shown. The outer square has side lengths of 16 feet. What is the total length of tape the teacher uses to mark Square A?

\[P = (8\text{ ft} + 8\text{ ft}) + (8\text{ ft} + 8\text{ ft})\]
\[P = 16\text{ ft} + 16\text{ ft}\]
\[P = 32\text{ ft}\]

The total length of tape the teacher uses for Square "A" is 32 ft.
1. a. Find the perimeter of 5 circular objects from home to the nearest quarter inch using string. Record the name and perimeter of each object in the chart below.

<table>
<thead>
<tr>
<th>Object</th>
<th>Perimeter (to the nearest quarter inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Peanut Butter Jar Cap</td>
<td>9 1/2 inches</td>
</tr>
<tr>
<td>\textit{Answers will vary}</td>
<td></td>
</tr>
</tbody>
</table>

b. Explain the steps you used to find the perimeter of the circular objects in the chart above.

First I wrapped the string around the perimeter of the object. Then I marked where the string met. Finally, I used a ruler to measure the length of the string to the mark.
2. Use your string and ruler to find the perimeter of the two shapes below to the nearest quarter inch.

![Shapes A and B](image)

- **Perimeter of Shape A**: $7 \frac{3}{4}$ in
- **Perimeter of Shape B**: $8 \frac{1}{2}$ in

a. Which shape has a greater perimeter?

   **B has the greater perimeter.**

b. Find the difference between the two perimeters.

   ![Difference between perimeters](image)

   The difference is $1$ inch.

3. Describe the steps you took to find the perimeter of the objects in Problem 2. Would you use this method to find the perimeter of a square? Explain why or why not.

   I took a piece of string and put it around the shape and marked it where it met. Then I measured it with a ruler. No, I wouldn’t use this method because a square has straight sides so I would measure the side lengths using a ruler. It will give me a more exact answer. Using string only gives me an estimate.
1. The shapes below are made up of rectangles. Label the unknown side lengths. Then, write and solve an equation to find the perimeter of each shape.

a. \[ p = 32 \text{ m} \]
   \[ P = (2 \times 7 \text{ m}) + 9 \text{ m} + 4 \text{ m} + 3 \text{ m} + 2 \text{ m} \]
   \[ P = 14 \text{ m} + 13 \text{ m} + 5 \text{ m} \]
   \[ P = 32 \text{ m} \]

b. \[ p = 34 \text{ cm} \]
   \[ P = (2 \times 4 \text{ cm}) + (2 \times 2 \text{ cm}) + 8 \text{ cm} + 6 \text{ cm} + 3 \text{ cm} + 6 \text{ cm} \]
   \[ P = 8 \text{ cm} + 4 \text{ cm} + 13 \text{ cm} + 9 \text{ cm} \]
   \[ P = 34 \text{ cm} \]

c. \[ p = 40 \text{ in} \]
   \[ P = (3 \times 4 \text{ in}) + (2 \times 6 \text{ in}) + (2 \times 2 \text{ in}) + 12 \text{ in} \]
   \[ P = 12 \text{ in} + 12 \text{ in} + 4 \text{ in} + 12 \text{ in} \]
   \[ P = 24 \text{ in} + 16 \text{ in} \]
   \[ P = 40 \text{ in} \]

d. \[ p = 27 \text{ ft} \]
   \[ P = (3 \times 3 \text{ ft}) + 2 \text{ ft} + 1 \text{ ft} + 8 \text{ ft} + 7 \text{ ft} \]
   \[ P = 9 \text{ ft} + 3 \text{ ft} + 15 \text{ ft} \]
   \[ P = 27 \text{ ft} \]
2. Sari draws and labels the squares and rectangle below. Find the perimeter of the new shape.

\[ P = (6 \times 6\text{cm}) + 18\text{cm} + 18\text{cm} \]
\[ P = 36\text{cm} + 36\text{cm} \]
\[ P = 72\text{cm} \]

The perimeter of the shape is 72 cm.

3. Label the unknown side lengths. Then, find the perimeter of the shaded rectangle.

\[ P = (2 \times 6\text{in}) + 13\text{in} + 13\text{in} \]
\[ P = 12\text{in} + 36\text{in} \]
\[ P = 48\text{in} \]

The perimeter of the shaded rectangle is 48 in.
1. Shade in squares on the grid below to create as many rectangles as you can with an area of 18 square centimeters. 

\[ 1 \times 18 = 18 \quad 2 \times 9 = 18 \quad 3 \times 6 = 18 \]

![Grid with shaded rectangles](image)

2. Find the perimeter of each rectangle in Problem 1 above.

\[ \text{(1)} \quad P = 18\text{cm} + 18\text{cm} + (2 \times 1\text{cm}) \]
\[ P = \frac{36\text{cm}}{36\text{cm}} + 2\text{cm} \]
\[ P = 38\text{cm} \]

\[ \text{(2)} \quad P = (2 \times 9\text{cm}) + (2 \times 2\text{cm}) \]
\[ P = 18\text{cm} + 4\text{cm} \]
\[ P = 22\text{cm} \]

\[ \text{(3)} \quad P = (2 \times 6\text{cm}) + (2 \times 3\text{cm}) \]
\[ P = 12\text{cm} + 6\text{cm} \]
\[ P = 18\text{cm} \]
3. Estimate to draw as many rectangles as you can with an area of 20 square centimeters. Label the side lengths of each rectangle.

\[
\begin{align*}
\text{20 cm} & , \quad 1 \text{ cm} \\
P &= 20 \text{ cm} + 20 \text{ cm} + 1 \text{ cm} + 1 \text{ cm} \\
P &= \underline{42 \text{ cm}} \\
10 \text{ cm} & , \quad 2 \text{ cm} \\
P &= 10 \text{ cm} + 10 \text{ cm} + 2 \text{ cm} + 2 \text{ cm} \\
P &= \underline{24 \text{ cm}} \\
5 \text{ cm} & , \quad 4 \text{ cm} \\
P &= 5 \text{ cm} + 5 \text{ cm} + 4 \text{ cm} + 4 \text{ cm} \\
P &= \underline{18 \text{ cm}}
\end{align*}
\]

a. Which rectangle above has the greatest perimeter? How do you know just by looking at its shape?

The 20 cm by 1 cm rectangle has the largest perimeter. I can see that this rectangle has the greatest boundary because it is long and skinny and more sides of each square are part of the perimeter.

b. Which rectangle above has the smallest perimeter? How do you know just by looking at its shape?

The 5 cm by 4 cm rectangle has the smallest perimeter. The rectangles that are wider and closer to being a square have some unit squares in the middle that don’t have any sides that are part of the perimeter.
1. Cut out the unit squares at the bottom of the page. Then, use them to make rectangles for each given number of unit squares. Complete the charts to show how many rectangles you can make for each given number of unit squares. You might not use all the spaces in each chart.

<table>
<thead>
<tr>
<th>Number of unit squares = 6</th>
<th>Number of unit squares = 7</th>
<th>Number of unit squares = 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of rectangles I made: 2</td>
<td>Number of rectangles I made: 1</td>
<td>Number of rectangles I made: 2</td>
</tr>
<tr>
<td>Width</td>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of unit squares = 9</th>
<th>Number of unit squares = 10</th>
<th>Number of unit squares = 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of rectangles I made: 2</td>
<td>Number of rectangles I made: 2</td>
<td>Number of rectangles I made: 1</td>
</tr>
<tr>
<td>Width</td>
<td>Length</td>
<td>Width</td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
2. Create a line plot with the data you collected in Problem 1.

Number of Rectangles Made With Unit Squares

6  7  8  9  10  11

Number of Unit Squares Used

X = 1 Rectangle

a. Luke looks at the line plot and says that all odd numbers of unit squares produce only 1 rectangle. Do you agree? Why or why not?

No, I don't agree because 9 is an odd number and it had 2 X's.

b. How many X's would you plot for 4 unit squares? Explain how you know.

4 unit squares
1x4
2x2

I would plot 2 X's for 4 unit squares because there are only 2 pair of factors that you can multiply to equal 4.
1. Cut out the unit squares at the bottom of the page. Then, use them to make as many rectangles as you can with a perimeter of 10 units.
   a. Estimate to draw your rectangles below. Label the side lengths of each rectangle.

   - 2 units
   - 3 units
   - \( P = 2 + 3 + 1 + 3 \)
   - \( P = 5 + 5 \)
   - \( P = 10 \) units

   - 4 units
   - 1 unit
   - \( P = 4 + 1 + 4 + 1 \)
   - \( P = 5 + 5 \)
   - \( P = 10 \) units

   b. Find the areas of the rectangles in Part (a) above.

   - 2 units
   - 3 units
   - \( A = 3 \times 2 \)
   - \( A = 6 \) sq. units

   - 4 units
   - 1 unit
   - \( A = 4 \times 1 \)
   - \( A = 4 \) sq. units
2. Gino uses unit square tiles to make rectangles with a perimeter of 14 units. He draws his rectangles as shown below. Using square unit tiles, can Gino make another rectangle that has a perimeter of 14 units? Explain your answer.

Yes, he can make a 5 by 2 rectangle. When you add \(5 + 5 + 2 + 2\), it equals 14.

3. Katie draws a square that has a perimeter of 20 centimeters.
   a. Estimate to draw Katie’s square below. Label the length and width of the square.

   \[
   P = 5\text{cm} + 5\text{cm} + 5\text{cm} + 5\text{cm} \\
   P = 20\text{cm}
   \]

   b. Find the area of Katie’s square.

   \[
   A = 5 \times 5 \\
   A = 25 \text{ sq. cm.}
   \]

   c. Estimate to draw a different rectangle that has the same perimeter as Katie’s square.

   \[
   P = 6\text{cm} + 4\text{cm} + 6\text{cm} + 4\text{cm} \\
   P = 20\text{cm}
   \]

   d. Which shape has a greater area, Katie’s square or your rectangle?

   \[
   \text{Rectangle} \\
   A = 4 \times 6 \\
   A = 24 \text{ sq. cm}
   \\
   \text{Katie’s square has the greater area.}
   \]
1. Margo finds as many rectangles as she can with a perimeter of 14 centimeters.
   a. Shade Margo's rectangles on the grid below. Label the length and width of each rectangle.

   ![Grid with labeled rectangles](image)

   b. Find the areas of the rectangles in Part (a) above.

   Rectangle A: \( A = 1 \times 6 = 6 \text{ sq. cm} \)
   B: \( A = 2 \times 5 = 10 \text{ sq. cm} \)
   C: \( A = 3 \times 4 = 12 \text{ sq. cm} \)

   c. The perimeters of the rectangles are the same. What do you notice about the areas?

   The areas are different because the side lengths are different.
2. Tanner uses unit squares to build rectangles that have a perimeter of 18 units. He creates the chart below to record his findings.

a. Complete Tanner’s chart. You might not use all the spaces in the chart.

<table>
<thead>
<tr>
<th>Perimeter = 18 units</th>
<th>Number of rectangles I made: 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Length</td>
</tr>
<tr>
<td>1 unit</td>
<td>8 units</td>
</tr>
<tr>
<td>2 units</td>
<td>7 units</td>
</tr>
<tr>
<td>3 units</td>
<td>6 units</td>
</tr>
<tr>
<td>4 units</td>
<td>5 units</td>
</tr>
</tbody>
</table>

b. Explain how you found the widths and lengths in the chart above.

I started with one and found pairs of doubles that added up to the perimeter.

3. Jason and Dina both draw rectangles with perimeters of 12 centimeters, but their rectangles have different areas. Explain with words, pictures, and numbers how this is possible.

Jason

\[ A = 1 \times 5 \]
\[ A = 5 \text{ sq. cm} \]

Dina

\[ A = 2 \times 4 \]
\[ A = 8 \text{ sq. cm} \]

It is possible because their side lengths are different.
1. The following line plot shows the number of rectangles a student made using square unit tiles. Use the line plot to answer the questions below.

![Number of Rectangles Made with a Given Perimeter](image)

<table>
<thead>
<tr>
<th>Perimeter Measurements</th>
<th>X = 1 Rectangle</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 6 8 10 12 14 16 18 20 22 24 26 28 30</td>
<td></td>
</tr>
</tbody>
</table>

a. Why are all of the perimeter measurements even? Do all rectangles have even perimeters?

All the perimeters are even because we made rectangles with whole number side lengths and when you double a whole number the sum is always even.

No, all rectangles don't have an even perimeter. If the side lengths of a rectangle aren't whole numbers then the perimeter will be odd.

b. Explain the pattern in the line plot. What types of side lengths make this pattern possible?

The pattern in the line plot is the number of x's grows in pairs by 1.

This is possible because the side lengths are whole numbers.

c. How many x's would you draw for a perimeter of 32? Explain how you know.

I would draw 8 x's because 28 and 30 had 7 x's so 31 and 32 would have one more x. I was following the pattern I noticed from part b.
2. Luis uses square inch tiles to build a rectangle with a perimeter of 24 inches. Does knowing this help him find the number of rectangles he can build with an area of 24 square inches? Why or why not?

No, it does not help him because the number of rectangles he can make with a perimeter of 24 is not the same as the number of rectangles he can make with an area of 24.

\[ P = 24 \text{ in} \]

\[ \text{Area} = 24 \text{ sq. in.} \]

\[
\begin{align*}
1 \times 11 & \quad \{ \text{6 rectangles} \} \\
2 \times 10 & \quad 1 \times 24 \\
3 \times 9 & \quad 2 \times 12 \\
4 \times 8 & \quad 3 \times 8 \\
5 \times 7 & \quad 4 \times 6 \\
6 \times 6 & \\
\end{align*}
\]

3. Esperanza makes a rectangle with a piece of string. She says the perimeter of her rectangle is 33 centimeters. Explain how it’s possible for her rectangle to have an odd perimeter.

It’s possible for her rectangle to have an odd perimeter because the sides are not whole numbers. They could be mixed numbers or fractions.
1. Rosie draws a square with a perimeter of 36 inches. What are the side lengths of the square?

\[ n = \frac{36}{4} \]
\[ n = 9\text{ in} \]

The side lengths of the square are 9 inches.

2. Judith uses craft sticks to make two 24-inch by 12-inch rectangles. What is the total perimeter of the 2 rectangles?

\[ P = 24\text{ in} + 24\text{ in} + 12\text{ in} + 12\text{ in} \]
\[ P = \frac{48\text{ in}}{72\text{ in}} + \frac{24\text{ in}}{72\text{ in}} \]
\[ P = 72\text{ in} \]

The total perimeter of the 2 rectangles is 144 in.

3. An architect draws a square and a rectangle as shown below to represent a house that has a garage. What is the total perimeter of the house with its attached garage?

\[ P = 40\text{ ft} + 55\text{ ft} + 30\text{ ft} + 30\text{ ft} + 30\text{ ft} + 10\text{ ft} + 55\text{ ft} \]
\[ P = 250\text{ ft} \]

The total perimeter is 250 ft.
4. Manny draws 3 regular pentagons to create the shape shown below. The perimeter of 1 of the pentagons is 45 inches. What is the perimeter of Manny’s new shape?

\[ 45 \div 5 = 9 \text{ inches} \]
\[ p = 11 \times 9 \text{ in} \]
\[ p = 99 \text{ in} \]
Manny’s new shape has a perimeter of 99 inches.

5. Johnny uses 2-inch square tiles to make a square, as shown below. What is the perimeter of Johnny’s square?

\[ p = 12 \text{ twos} \]
\[ p = 10 \text{ twos} + 2 \text{ twos} \]
\[ p = 20 + 4 \]
\[ p = 24 \text{ inches} \]
The perimeter of Johnny’s square is 24 inches.

6. Lisa tapes three 7-inch by 9-inch pieces of construction paper together to make a happy birthday sign for her mom. She uses a piece of ribbon that is 144 inches long to make a border around the outside edges of the sign. How much ribbon is left over?

\[ 76 \text{ inches of ribbon will be left over.} \]
1. Brian draws a square with a perimeter of 24 inches. What is the width and length of the square?

\[ 24 \div 4 = 6 \]

The width and length of each side of the square is 6 inches.

\[ P = 24 \text{ in} \]

2. A rectangle has a perimeter of 18 centimeters.
   
a. Estimate to draw as many different rectangles as you can that have a perimeter of 18 centimeters. Label the width and length of each rectangle.

   ![Rectangles]

   6 cm
   3 cm
   3 cm
   5 cm

   2 cm
   1 cm
   7 cm

   I found 4 different rectangles.

   I started with a side of 1 cm and found pairs of doubles that added up to 18 cm.

   c. Explain the strategy you used to find the rectangles.

Lesson 24: Use rectangles to draw a robot with specified perimeter measurements, and reason about the different areas that may be produced.
Answers will vary

3. The chart below shows the perimeters of three rectangles.

   a. Write possible widths and lengths for each given perimeter.

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Perimeter</th>
<th>Width and Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6 cm</td>
<td>1 cm by 2 cm</td>
</tr>
<tr>
<td>B</td>
<td>10 cm</td>
<td>2 cm by 3 cm</td>
</tr>
<tr>
<td>C</td>
<td>14 cm</td>
<td>2 cm by 5 cm</td>
</tr>
</tbody>
</table>

   b. Double the perimeters of the rectangles in Part (a). Then, find possible widths and lengths.

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Perimeter</th>
<th>Width and Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12 cm</td>
<td>1 cm by 5 cm</td>
</tr>
<tr>
<td>B</td>
<td>20 cm</td>
<td>4 cm by 6 cm</td>
</tr>
<tr>
<td>C</td>
<td>28 cm</td>
<td>5 cm by 9 cm</td>
</tr>
</tbody>
</table>
The robot below is made of rectangles. The side lengths of each rectangle are labeled. Find the perimeter of each rectangle, and record it in the table on the next page.
<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(P = 4 \times 4) cm (P = 16) cm</td>
</tr>
<tr>
<td>B</td>
<td>(P = 2 \times 2) cm (P = 4) cm</td>
</tr>
<tr>
<td>C</td>
<td>(P = (2 \times 6) cm (+(2 \times 8) cm (P = 12) cm (+ 16) cm (P = 28) cm</td>
</tr>
<tr>
<td>D</td>
<td>(P = (2 \times 2) cm (+(2 \times 5) cm (P = 4) cm (+ 10) cm (P = 14) cm</td>
</tr>
<tr>
<td>E</td>
<td>(P = 14) cm</td>
</tr>
<tr>
<td>F</td>
<td>(P = (2 \times 7) cm (+(2 \times 2) cm (P = 14) cm (+ 4) cm (P = 18) cm (same)</td>
</tr>
<tr>
<td>G</td>
<td>(P = 18) cm</td>
</tr>
</tbody>
</table>
1. Use Rectangles A and B to answer the questions below.

![Diagram of Rectangles A and B with dimensions](image)

a. What is the perimeter of Rectangle A?
   
   \[ P = 4 \times 4 \text{cm} \]
   
   \[ P = 16 \text{cm} \]

b. What is the perimeter of Rectangle B?
   
   \[ P = (2 \times 3 \text{cm}) + (2 \times 5 \text{cm}) \]
   
   \[ P = 6 \text{cm} + 10 \text{cm} \]
   
   \[ P = 16 \text{cm} \]

c. What is the area of Rectangle A?
   
   \[ A = 4 \times 4 = 16 \text{ sq. cm} \]

d. What is the area of Rectangle B?
   
   \[ A = 3 \times 5 = 15 \text{ sq. cm} \]

e. Use your answers to Parts (a–d) to help you explain the relationship between area and perimeter.

There is no relationship between area and perimeter. They are two separate things. You can have many different areas for the same perimeter.
2. Each student in Mrs. Dutra’s class draws a rectangle with whole number side lengths and a perimeter of 28 centimeters. Then, they find the area of each rectangle and create the table below.

<table>
<thead>
<tr>
<th>Area in Square Centimeters</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
</tr>
<tr>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>45</td>
<td>4</td>
</tr>
<tr>
<td>48</td>
<td>2</td>
</tr>
<tr>
<td>49</td>
<td>2</td>
</tr>
</tbody>
</table>

a. Give two examples from Mrs. Dutra’s class to show how it is possible to have different areas for rectangles that have the same perimeter.

\[
P = 28\ 
\begin{align*}
A &= 4 \times 10 = 40 \text{ sq. cm.} \\
6 \times 8 &= 48 \text{ sq. cm.}
\end{align*}
\]

b. Did any students in Mrs. Dutra’s class draw a square? Explain how you know.

\[
28 \div 4 = 7
\]

\[
A = 7 \times 7 = 49 \text{ sq. cm.}
\]

Yes, 2 students drew a square. I divided 28 ÷ 4 and got 7. So each side had a length of 7 cm. Then I found the area by multiplying 7 × 7 = 49.

c. What are the side lengths of the rectangle that most students in Mrs. Dutra’s class made with a perimeter of 28 centimeters?

Area = 40 sq. cm → most students

\[
P = 28\ 
\begin{align*}
10 \text{ cm} & \\
A &= 4 \times 10 = 40 \text{ sq. cm.} \\
4 \times 10 &= 40 \text{ sq. cm.}
\end{align*}
\]

The side lengths are 4 cm and 10 cm.

Lastly, I looked at the chart and saw 5 kids drew a rectangle with an area of 49 sq. cm.
Record the perimeters and areas of the rectangles in the chart on the next page.

A = 6 \times 6 = 36 \text{ sq cm}

P = 4 \times 6
P = 24 \text{ cm}

B = 4 \times 8 = 32 \text{ sq cm}

P = (2 \times 4) + (2 \times 8)
P = 8 + 16
P = 24 \text{ cm}

C = 1 \times 11 = 11 \text{ sq cm}

P = (1 \times 11) + (2 \times 1)
P = 22 + 2
P = 24 \text{ cm}

D = 5 \times 5 = 25 \text{ sq cm}

P = 4 \times 5
P = 20 \text{ cm}

E = 2 \times 8 = 16 \text{ sq cm}

P = (2 \times 2) + (2 \times 8)
P = 4 + 16
P = 20 \text{ cm}

F = 4 \times 6 = 24 \text{ sq cm}

P = (2 \times 4) + (2 \times 6)
P = 8 + 12
P = 20 \text{ cm}
1. Find the area and perimeter of each rectangle.

<table>
<thead>
<tr>
<th>Rectangle</th>
<th>Width and Length</th>
<th>Perimeter</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6 cm by 6 cm</td>
<td>24 cm</td>
<td>36 sq cm</td>
</tr>
<tr>
<td>B</td>
<td>4 cm by 8 cm</td>
<td>24 cm</td>
<td>32 sq cm</td>
</tr>
<tr>
<td>C</td>
<td>11 cm by 1 cm</td>
<td>24 cm</td>
<td>11 sq cm</td>
</tr>
<tr>
<td>D</td>
<td>5 cm by 5 cm</td>
<td>20 cm</td>
<td>25 sq cm</td>
</tr>
<tr>
<td>E</td>
<td>2 cm by 8 cm</td>
<td>20 cm</td>
<td>16 sq cm</td>
</tr>
<tr>
<td>F</td>
<td>4 cm by 6 cm</td>
<td>20 cm</td>
<td>24 sq cm</td>
</tr>
</tbody>
</table>

2. What do you notice about the perimeters of Rectangles A, B, and C?

   All the perimeters are 24 cm.

3. What do you notice about the perimeters of Rectangles D, E, and F?

   All the perimeters are 20 cm.

4. Which two rectangles are squares? Which square has the greater perimeter?

   Rectangles A and D are squares.
   Square A has the greater perimeter.
1. Carl draws a square that has side lengths of 7 centimeters.
   a. Estimate to draw Carl's square, and label the side lengths.

   ![Diagram of a square with side lengths of 7 cm]

   b. What is the area of Carl's square?

   \[ A = 7 \times 7 \]
   \[ A = 49 \text{ sq. cm.} \]

   The area of Carl's square is 49 sq. cm.

   c. What is the perimeter of Carl's square?

   \[ P = 4 \times 7 \text{ cm} \]
   \[ P = 28 \text{ cm} \]

   The perimeter of Carl's square is 28 cm.

   d. Carl draws two of these squares to make one long rectangle. What is the perimeter of this rectangle?

   ![Diagram of two squares combined to form a rectangle]

   \[ P = 6 \times 7 \text{ cm} \]
   \[ P = 42 \text{ cm} \]

   The perimeter of this rectangle is 42 cm.
2. Mr. Briggs puts food for the class party on a rectangular table. The table has a perimeter of 18 feet and a width of 3 feet.

   a. Estimate to draw the table, and label the side lengths.

   \[ \text{3 ft.} \quad ? \text{ 6 ft} \quad \text{3 ft.} \quad ? \text{ 6 ft} \]
   \[3 + 3 + 6 + 6 = 18 \quad \frac{6 + 12}{} = 18\]

   b. What is the length of the table?

   The length of the table is 6 ft.

   c. What is the area of the table?

   \[ A = 3 \times 6 = 18 \text{ sq. ft.} \]

   d. Mr. Briggs puts three of these tables together side by side to make 1 long table. What is the area of the long table?

   \[ A = 3 \times 18 \quad A = 3 \times (10 + 8) \quad A = (3 \times 10) + (3 \times 8) \quad A = 30 + 24 \quad A = 54 \text{ sq. ft.} \]
1. Katherine puts two squares together to make the rectangle below. The side lengths of the squares measure 8 inches.

![Diagram of rectangle with side lengths 8 in and 16 in]

a. What is the perimeter of the rectangle Katherine made with her 2 squares?

\[ P = 6 \times 8 \text{ in} \]
\[ P = 48 \text{ inches} \]

b. What is the area of Katherine’s rectangle?

\[ A = 8 \times 16 \]
\[ A = 8 \times (10 + 6) \]
\[ A = (8 \times 10) + (8 \times 6) \]
\[ A = 80 + 48 \]
\[ A = 128 \text{ sq. in.} \]

or

\[ A = \frac{80}{128} \]

The total area is 128 sq. in.

Rec. 1
\[ A = 8 \times 8 \text{ sq. in.} \]
\[ A = 64 \text{ sq. in.} \]

Rec. 2
\[ A = 8 \times 8 \text{ sq. in.} \]
\[ A = 64 \text{ sq. in.} \]

The total area is 128 sq. in.

64

128


c. Katherine decides to draw another rectangle of the same size. What is the area of the new, larger rectangle?

![Diagram of rectangles with side lengths 8 in and 16 in]

\[ A = 128 \text{ sq. cm} \]
\[ A = 128 \text{ sq. cm} \]

\[ 128 \]
\[ +128 \]
\[ = 256 \]

The new larger rectangle has an area of 256 sq. in.
2. Daryl draws 6 equal-size rectangles as shown below to make a new, larger rectangle. The area of one of the small rectangles is 12 square centimeters, and the width of the small rectangle is 4 centimeters.

![Diagram of rectangles]

a. What is the perimeter of Daryl’s new rectangle?

\[ P = (6 \times 4\text{cm}) + (4 \times 3\text{cm}) \]
\[ P = 24\text{cm} + 12\text{cm} \]
\[ P = 36\text{cm}. \]

b. What is the area of Daryl’s new rectangle?

\[ A = 6 \times 12 \]
\[ A = 6 \times (10 + 2) \]
\[ A = (6\times10) + (6 \times 2) \]
\[ A = 60 + 12 \]
\[ A = 72 \text{ sq. cm.} \]

3. The recreation center soccer field measures 35 yards by 65 yards. Chris dribbles the soccer ball around the perimeter of the field 4 times. What is the total number of yards Chris dribbles the ball?

\[ P = 35\text{yd} + 35\text{yd} + 65\text{yd} + 65\text{yd} \]
\[ P = 130\text{yd} + 130\text{yd} \]
\[ P = 200\text{yd} \text{ for 1 field} \]
\[ 4 \text{ Fields} \]
\[ 200\text{yd} + 200\text{yd} + 200\text{yd} + 200\text{yd} + 200\text{yd} + 200\text{yd} + 200\text{yd} \]
\[ = 800\text{yd} \]

Chris dribbles the ball 800 yards.
Use this form to critique Student A’s problem-solving work on the next page.

<table>
<thead>
<tr>
<th>Student:</th>
<th>Student A</th>
<th>Problem number:</th>
</tr>
</thead>
</table>
| **Strategies Student A used:** | • Drew a picture of the 2 rectangles and labeled the side lengths.  
• Multiplied 6 sides by 8 in to find perimeter.  
• Used distributive property to find area.  
• Drew new, larger rectangle and labeled the side lengths. | |
| **Things Student A did well:** | • Drew and labeled pictures nicely.  
• Used multi. to find perimeter instead of repeated addition.  
• Used distributive property to solve a hard area problem.  
• Used answer from part b to get answer for part c. | |
| **Suggestions for improvement:** | **Answers will vary** | |
| **Strategies I would like to try based on Student A’s work:** | • Remember to use multiplication for repeated addition  
• Remember to use distributive property when solving a hard multiplication problem  
• Remember to use an answer from another part when I can so not to do the work twice. | |