

Measuring Length

Goal Select an appropriate measuring unit.

1. State an appropriate unit for each length.
 - a) the distance you travel to go to school
kilometres
 - b) the thickness of a coin
millimetres
 - c) the height of a house
metres
 - d) the width of a CD
centimetres

2. Explain why you chose the unit you did for one answer in Question 1.

Suggested answer: I chose centimetres for the width of a CD because metres are too large to use and millimetres are too small to use.

3. Give an example of an item that might be measured in these units.

- a) metres
Suggested answer: length of fabric
- b) millimetres
Suggested answer: thickness of a DVD
- c) centimetres
Suggested answer: length of a book
- d) kilometres
Suggested answer: height of a tall mountain

At-Home Help

The most common units for length used in the metric system are millimetres, centimetres, metres, and kilometres.

When you measure a length, choose a unit that is appropriate for the size of the object.

For example, to measure the height of a tree, use metres or decametres.

To measure the length of a floor tile, use centimetres.

To measure the thickness of a pencil, use millimetres.

To measure the distance between two cities, use kilometres.

$$1 \text{ cm} = 10 \text{ mm}$$

$$1 \text{ dam} = 10 \text{ m}$$

$$1 \text{ m} = 100 \text{ cm}$$

$$1 \text{ km} = 1000 \text{ m}$$

Metric Relationships

Goal Interpret and compare measurements with different units.

1. Rename each measurement using the new unit.

a) 6.04 cm to millimetres

$$60.4 \text{ mm}$$

b) 7.28 km to metres

$$7280 \text{ m}$$

c) 0.591 m to centimetres

$$59.1 \text{ cm}$$

d) 2.006 km to metres

$$2006 \text{ m}$$

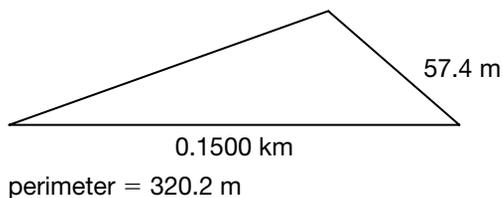
e) 4.13 m to centimetres

$$413 \text{ cm}$$

f) 8.9 cm to millimetres

$$89 \text{ mm}$$

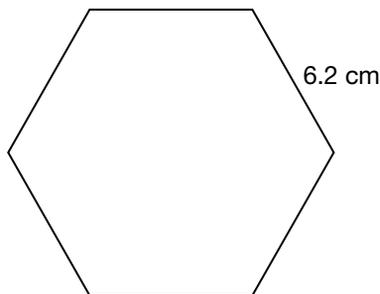
2. A playground at a community centre is triangular in shape. Calculate the length of the third side.



$$\begin{aligned} \text{length of two sides} &= 0.1500 \text{ km} + 57.4 \text{ m} \\ &= 150.0 \text{ m} + 57.4 \text{ m} \\ &= 207.4 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{length of third side} &= 320.2 \text{ m} - 207.4 \text{ m} \\ &= 112.8 \text{ m} \end{aligned}$$

3. A box of chocolates is in the shape of a regular hexagon. The side length of the hexagon is 6.2 cm. What is the perimeter of the box?



$$\begin{aligned} \text{perimeter} &= 6 \times 6.2 \text{ cm} \\ &= 37.2 \text{ cm} \end{aligned}$$

At-Home Help

Length measurements can be compared when they are written in the same units.

For example, to write a length in metres as a length in centimetres, use the fact that $1 \text{ m} = 100 \text{ cm}$.

3.48 m is the same as 348 cm .

If a problem gives you a shape that has side lengths in different units, write all the measurements you are given in the same unit.

$$1 \text{ cm} = 10 \text{ mm}$$

$$1 \text{ dam} = 10 \text{ m}$$

$$1 \text{ m} = 100 \text{ cm}$$

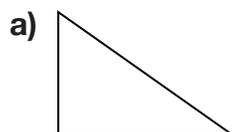
$$1 \text{ km} = 1000 \text{ m}$$

Perimeters of Polygons

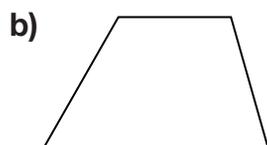
Goal Measure perimeters of polygons and draw polygons with given perimeters.

You will need a ruler.

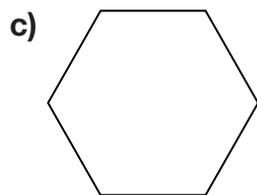
1. Measure the perimeter of each polygon.



$$\begin{aligned} \text{perimeter} &= 1.6 \text{ cm} + 2.3 \text{ cm} + 2.8 \text{ cm} \\ &= 6.7 \text{ cm} \end{aligned}$$



$$\begin{aligned} \text{perimeter} &= 2.0 \text{ cm} + 1.5 \text{ cm} + 1.8 \text{ cm} + 3.0 \text{ cm} \\ &= 8.3 \text{ cm} \end{aligned}$$

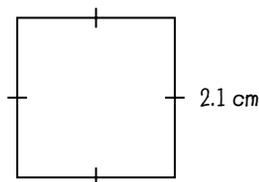
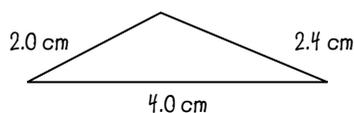


Suggested answer:

$$\begin{aligned} \text{perimeter} &= 6 \times 1.4 \text{ cm} \\ &= 8.4 \text{ cm} \end{aligned}$$

2. Draw two shapes with the same perimeter as the hexagon in Question 1.

Suggested answer:



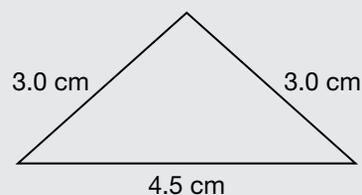
At-Home Help

Perimeter is the distance around a two-dimensional shape.

To determine the perimeter, measure each side length as accurately as you can using the same unit. Then calculate the sum of the lengths.

For example, for the triangle below,

$$\begin{aligned} \text{perimeter} &= 4.5 \text{ cm} + 3.0 \text{ cm} + 3.0 \text{ cm} \\ &= 10.5 \text{ cm} \end{aligned}$$



Solve Problems Using Logical Reasoning

Goal Use logical reasoning to solve a problem.

1. a) How many numbers between 100 and 600 have a 3 for at least one of the digits?

Suggested answer:

Understand the Problem

I need to find how many numbers between 100 and 600 have one, two, or three 3s in them.

Make a Plan

I can list the numbers between 100 and 199 that have at least one 3. I'll count them. These will be numbers with one or two 3s in them. These will be the same for numbers in the 200s, 400s, and 500s. For the 300s, every number begins with a 3 so I have to count all of them.

Carry Out the Plan

| | |
|------------|--|
| 100 to 200 | 103, 113, 123, 133, 143, 153, 163, 173, 183, 193 130, 131, 132, 134, 135, 136, 137, 138, 139 |
|------------|--|

There are 19 numbers that have a 3 for at least one of the digits between 100 and 199. I multiply by 4 for the 100s, 200s, 400s, and 500s. I add 100 for the 300s.

$$\begin{aligned} \text{total} &= 4 \times 19 + 100 \\ &= 76 + 100 \\ &= 176 \end{aligned}$$

Look Back

There are 176 numbers between 100 and 600 that have a 3 for at least one of the digits.

- b) How many numbers between 100 and 600 have a 7 for at least one of the digits?

The reasoning is the same except there are no numbers that have a 7 in the hundreds place. So I multiply 19 by 5 for the 100s, 200s, 300s, 400s, and 500s.

$$\begin{aligned} \text{total} &= 5 \times 19 \\ &= 95 \end{aligned}$$

There are 95 numbers between 100 and 600 that have a 7 for at least one of the digits.

At-Home Help

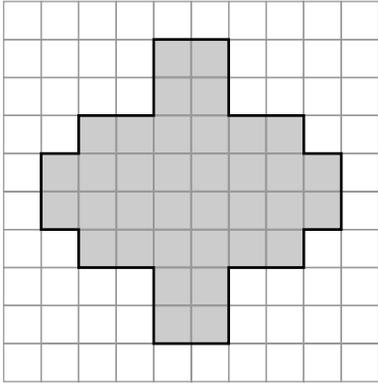
Logical reasoning is a process for using information you have to reach a conclusion.

For example, if you know all the students in a class like ice cream and that Jane is in the class, you can logically reason that Jane likes ice cream.

Exploring Perimeter

Goal Explore the relationship between perimeter and area measurements.

1. Vanessa drew a polygon inside a square.

**At-Home Help**

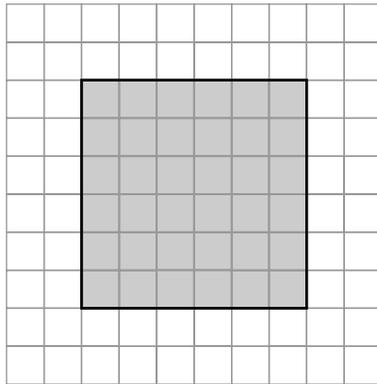
Area is a measurement of the amount of space a two-dimensional (2-D) shape covers.

- a) Determine the perimeter and the area of the polygon.

perimeter of polygon = 32 units area of polygon = 36 square units

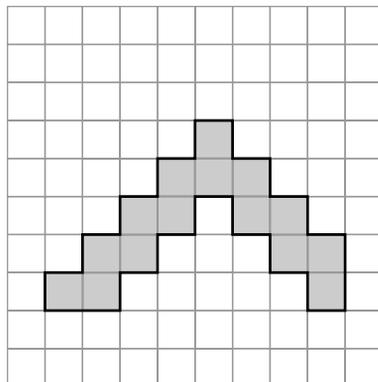
- b) Draw another polygon with the same area but a different perimeter.

Suggested answer:



- c) Draw another polygon with the same perimeter but a different area.

Suggested answer:



Test Yourself Page 1

Circle the correct answer.

You will need a ruler.

1. Which unit would be the most appropriate to measure the length of a desk?

A. millimetres

B. centimetres

C. metres

D. kilometres

2. Which measurement is the same as 0.51 km?

A. 51 m

B. 510 m

C. 5100 cm

D. 510 000 cm

3. Which measurement is *not* the same as 407 m?

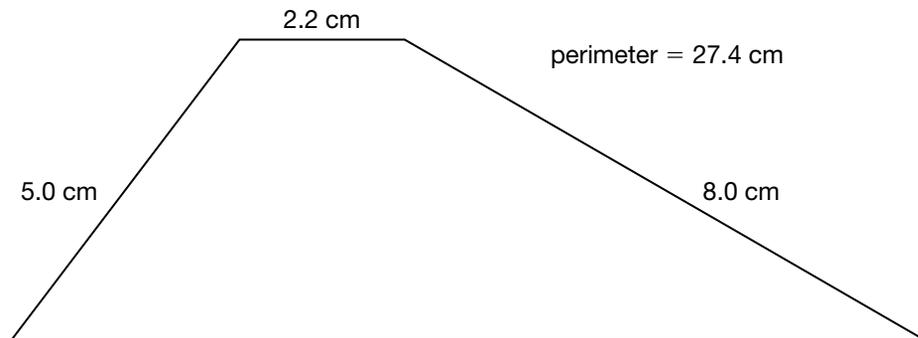
A. 407 000 mm

B. 40 700 cm

C. 4.07 km

D. 0.407 km

4. What is the length of the fourth side?



A. 12.2 cm

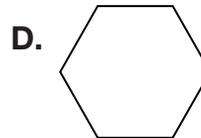
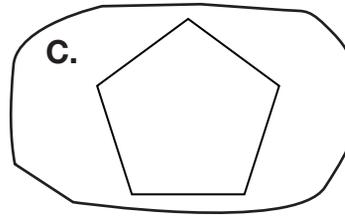
B. 12.3 cm

C. 12.4 cm

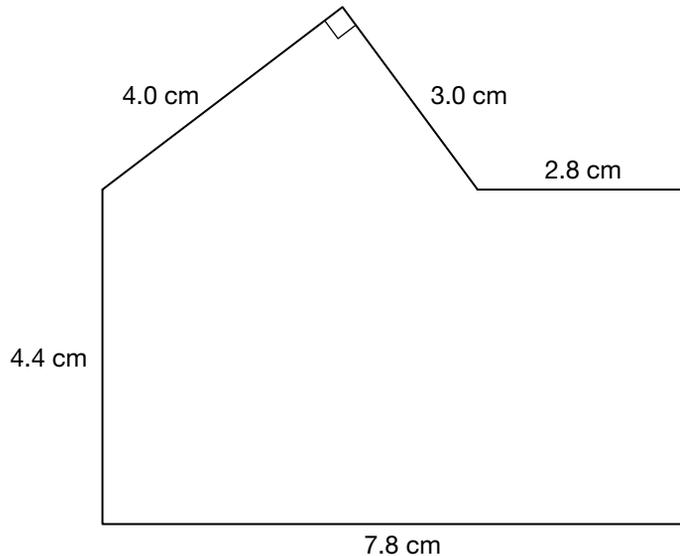
D. 12.5 cm

Test Yourself Page 2

5. Patrick drew these polygons actual size. Which polygon has a perimeter of 7.5 cm?



6. What is the perimeter of the polygon shown below?



A. 25.8 cm

C. 26.2 cm

B. 26.0 cm

D. 26.4 cm

7. The perimeters of two squares differ by 4.0 cm. The sum of the perimeters for the two squares is 16.0 cm. What is the side length of the larger square?

A. 1.0 cm

C. 2.0 cm

B. 1.5 cm

D. 2.5 cm

8. When the side length of a regular pentagon is increased, its perimeter increases by 12.5 cm. How much longer is the new side length?

A. 2.0 cm

B. 2.5 cm

C. 3.0 cm

D. 3.5