

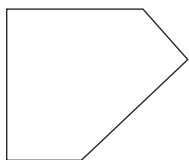
Investigating Polygons



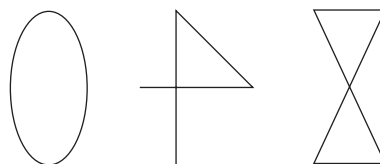
Quick Review

- ▶ A polygon is a closed shape with sides that are straight line segments. Exactly 2 sides meet at each vertex. The sides intersect only at the vertices.

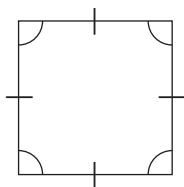
This shape is a polygon.



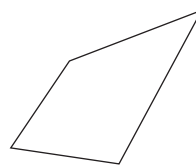
These shapes are **non-polygons**.



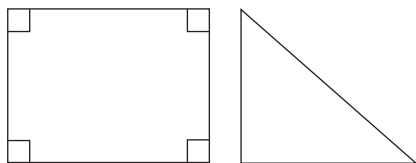
- ▶ A **regular polygon** has all sides and all angles equal. It also has line symmetry.



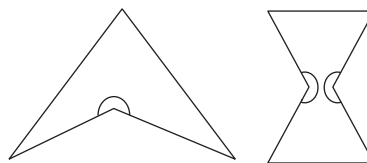
An **irregular polygon** does not have all sides equal and all angles equal.



- ▶ A **convex polygon** has all angles less than 180° .

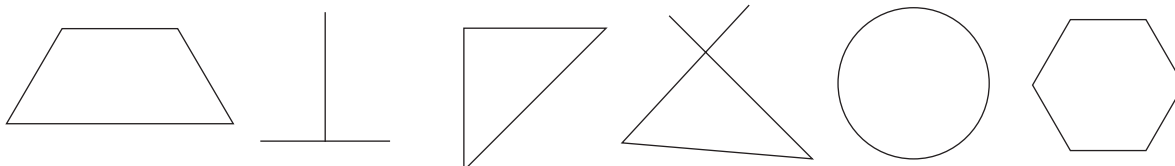


A **concave polygon** has at least one angle greater than 180° .



Try These

1. Circle each polygon.

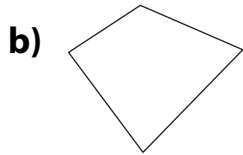


Practice

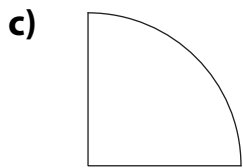
1. Match each shape to its description.



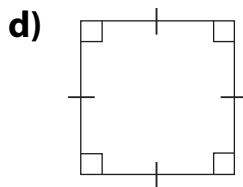
regular polygon



non-polygon

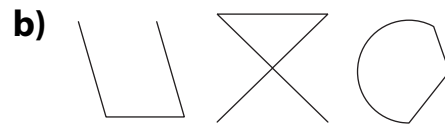


concave quadrilateral



convex quadrilateral

2. Draw a different shape that belongs in each set.



Stretch Your Thinking

Complete each polygon.

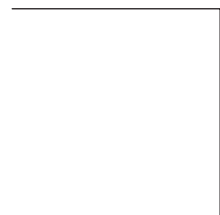
a) a convex polygon



b) a concave polygon



c) a regular polygon



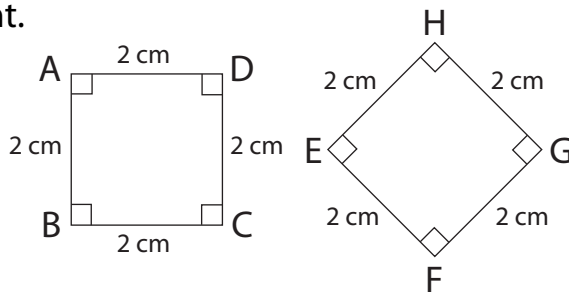
Congruence in Regular Polygons



Quick Review

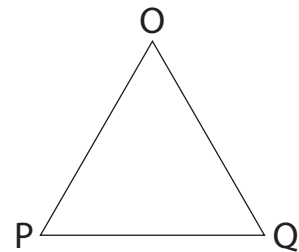
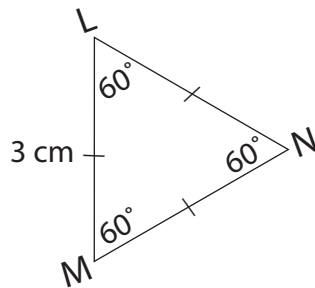
Here are 2 ways to show 2 squares are **congruent**.

- Place one square on top of the other. If they match exactly, they are congruent.
- Compare the side and angle measures. If all sides are equal and all angles are equal, the squares are congruent.

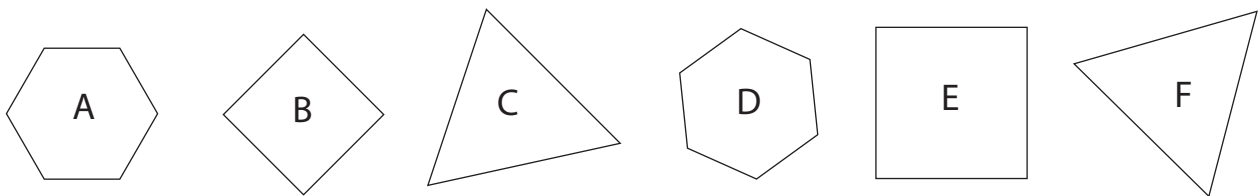


Try These

1. Triangles LMN and OPQ are congruent. Write the measure of each angle and the length of each side in OPQ.

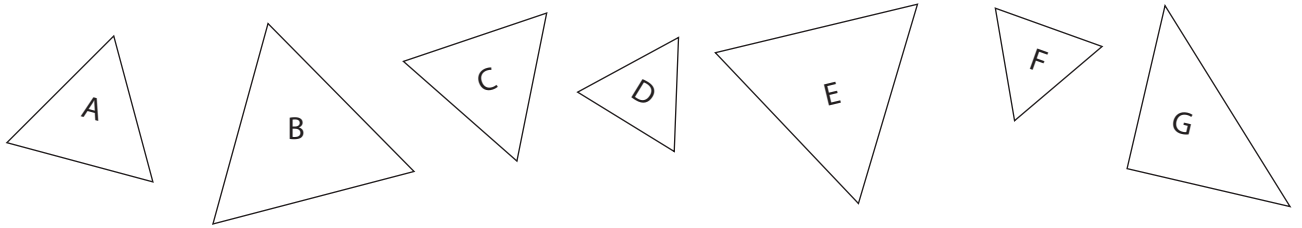


2. Which of these polygons are congruent? Explain how you know.

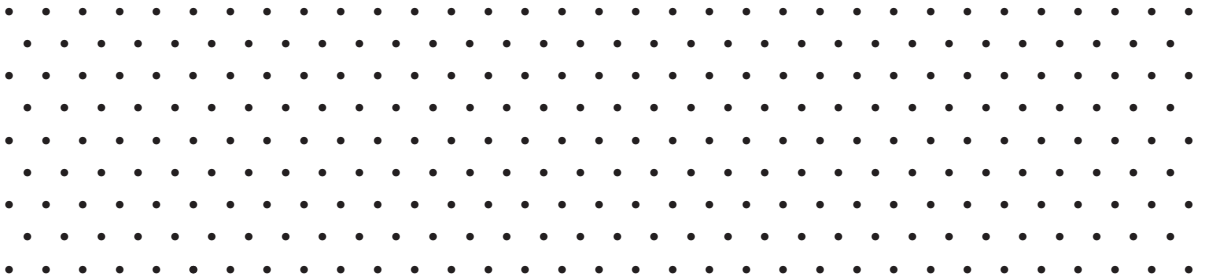


Practice

1. Find pairs of congruent triangles. Join each pair with a line.

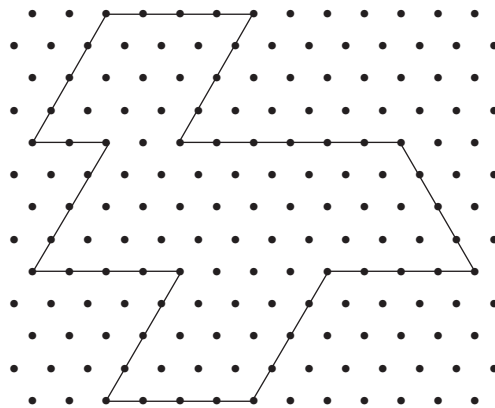


2. Draw 3 congruent regular triangles.
Label the angle measures and side lengths of each.



Stretch Your Thinking

Draw lines to divide this shape into 9 congruent triangles.



Perimeters of Polygons

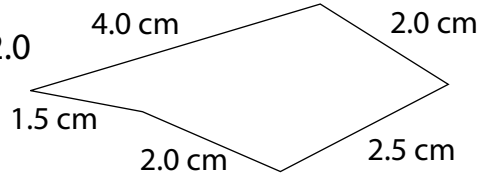


Quick Review

- We can find the perimeter of any polygon by adding the side lengths.
For this pentagon:

$$\begin{aligned} \text{Perimeter} &= 4.0 + 1.5 + 2.0 + 2.5 + 2.0 \\ &= 12 \end{aligned}$$

The perimeter is 12 cm.



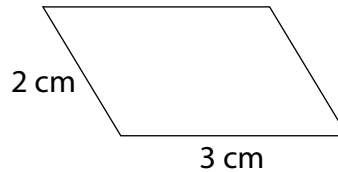
- We can use a formula to find the perimeter of some polygons.

Square



$$\begin{aligned} P &= s \times 4 \\ P &= 2 \times 4 \\ &= 8 \end{aligned}$$

Parallelogram



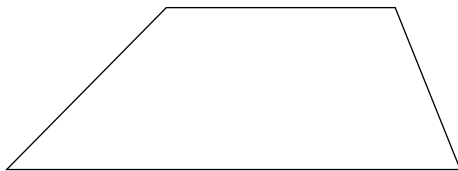
$$\begin{aligned} P &= 2 \times (\ell + s) \\ P &= 2 \times (3 + 2) \\ &= 2 \times 5 \\ &= 10 \end{aligned}$$

The perimeters of the polygons are 8 cm and 10 cm.

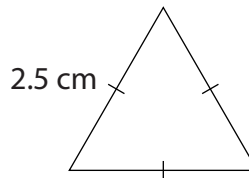
Try These

- Find the perimeter of each polygon.

a)

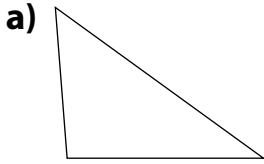


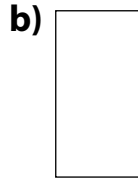
b)

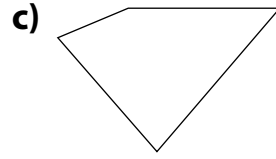


Practice

1. Find the perimeter of each polygon.







2. Kerry skates laps around the playground.

The playground is 150 m long and 50 m wide.

How many laps will it take Kerry to skate 1 km? _____

3. The perimeter of an equilateral triangle is 5.1 m. How long are its sides?
Give your answer in as many different units as you can.

4. The perimeter of an atlas is 1.4 m.

How long might each side be? _____

5. Suppose the side lengths of a rectangle are halved.

What would happen to the perimeter?

Stretch Your Thinking

One side of Kirby's rectangular garden measures 5 m.

The perimeter of the garden is 27 m.

Draw a sketch of Kirby's garden.

Label the side lengths.