Similar Figures

What does it mean for two shapes to be *similar*?
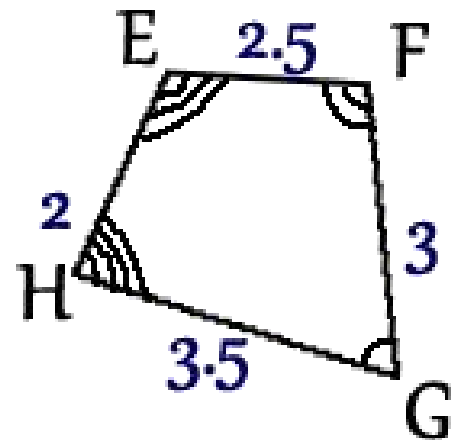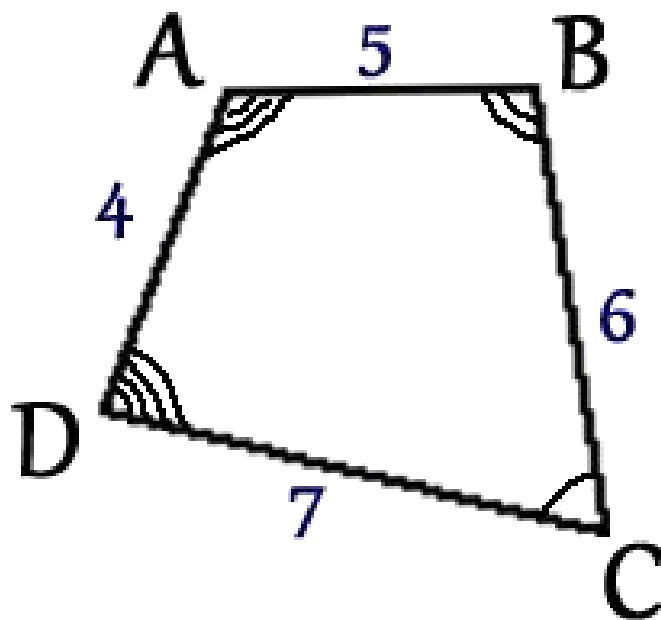
Are these shapes similar?
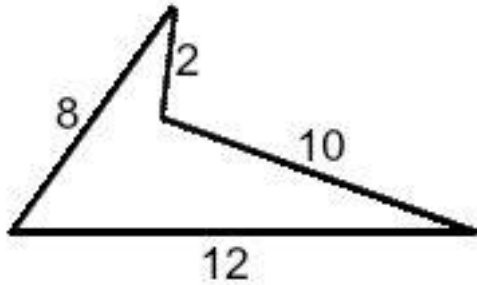
What is the ratio between the perimeters of these rectangles?
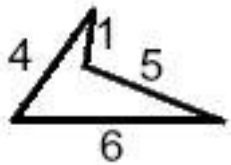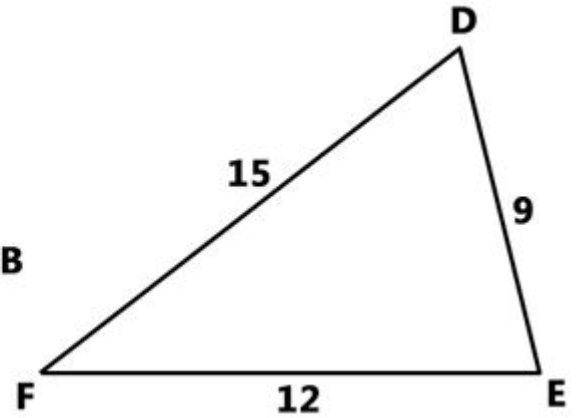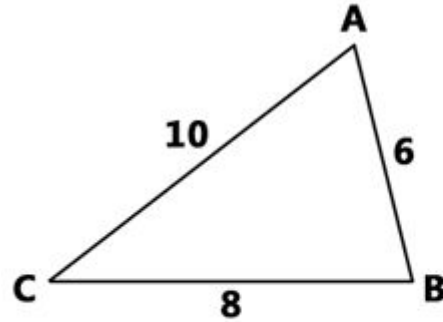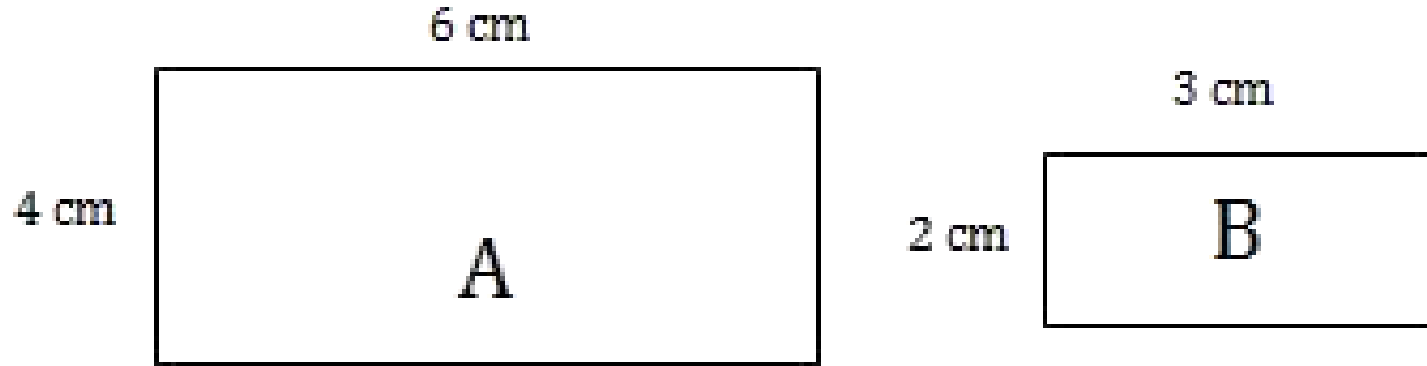
6 cm

4 cm

A

3 cm

2 cm

B

What is the ratio between the perimeters of these rectangles?

6 cm

4 cm

A

3 cm

2 cm

B
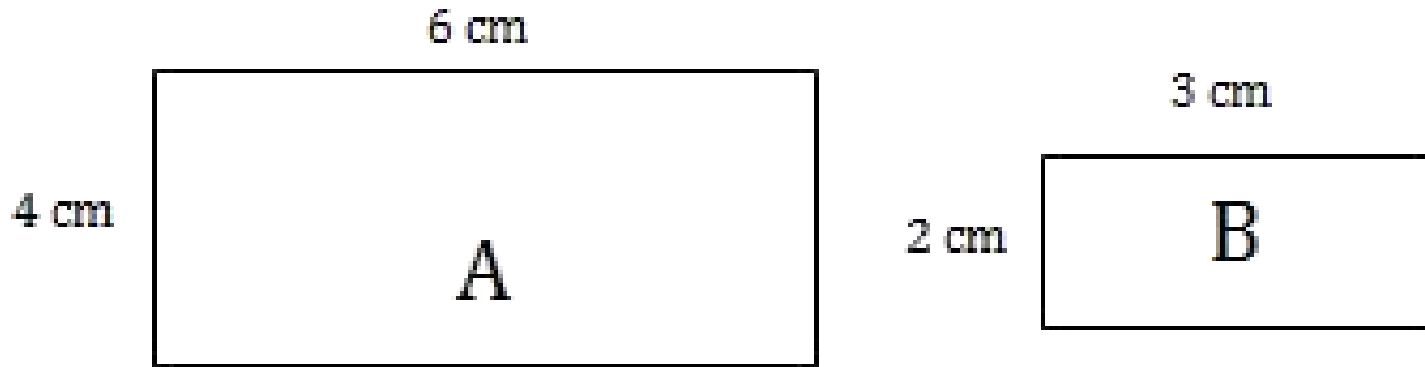
$$\frac{Perimeter\ of\ A}{Perimeter\ of\ B} = \frac{20}{10} = \frac{10(2)}{10} = 2$$

What is the ratio between the perimeters of these rectangles?

3t cm

2t cm

A

3 cm

B

2 cm
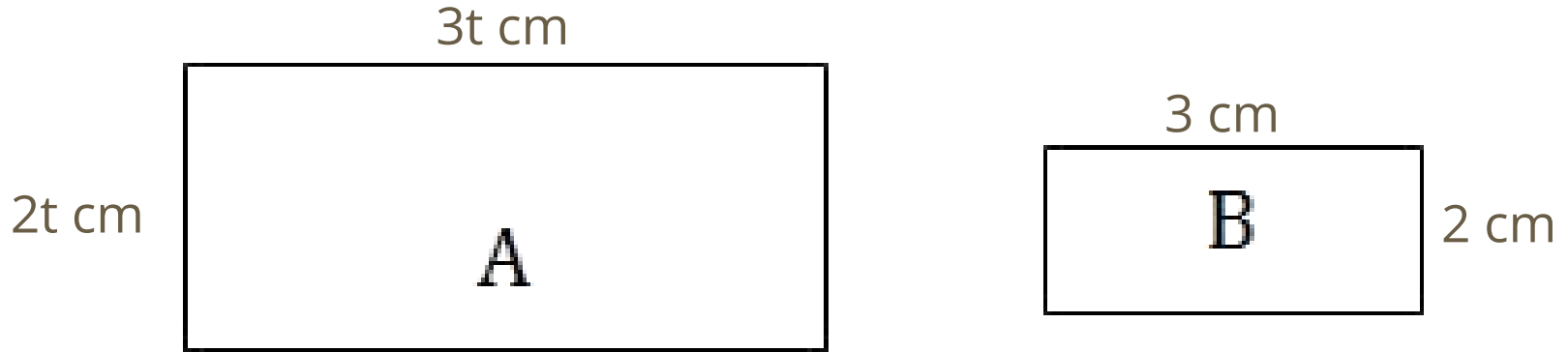
$$\frac{Perimeter\ of\ A}{Perimeter\ of\ B} = \frac{10t}{10} = \frac{10t}{10} = t$$
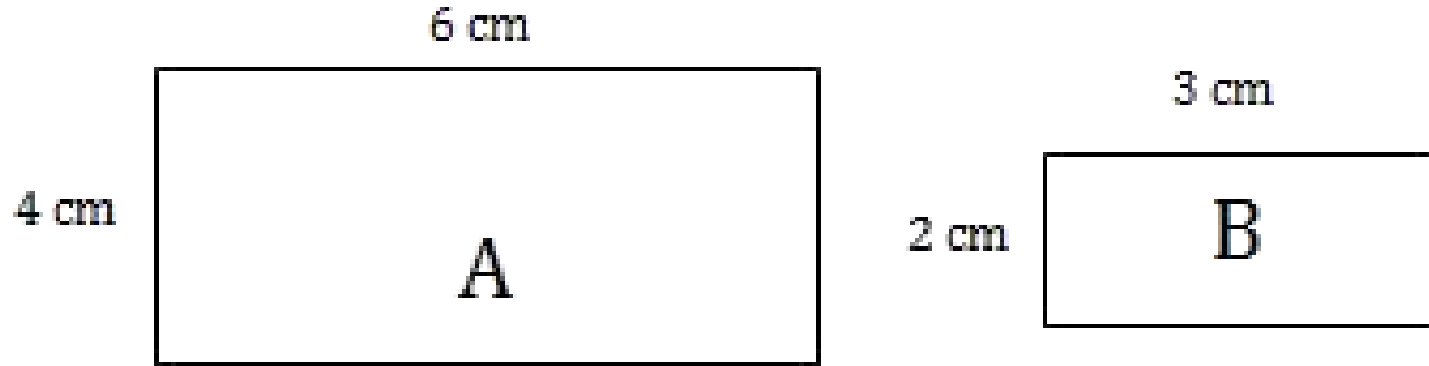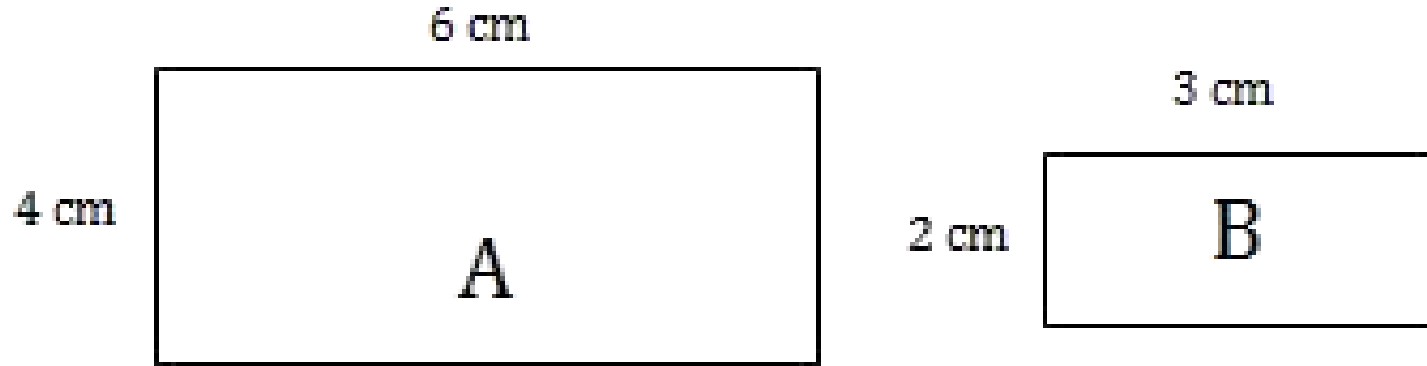
What is the ratio between the areas of these rectangles?

6 cm

4 cm

A

3 cm

2 cm

B

What is the ratio between the areas of these rectangles?

6 cm

3 cm

4 cm

A

2 cm

B

$$\frac{Area\ of\ A}{Area\ of\ B} = \frac{24}{6} = \frac{6(4)}{6} = 4$$

What is the ratio between the perimeters of these rectangles?
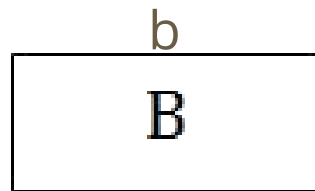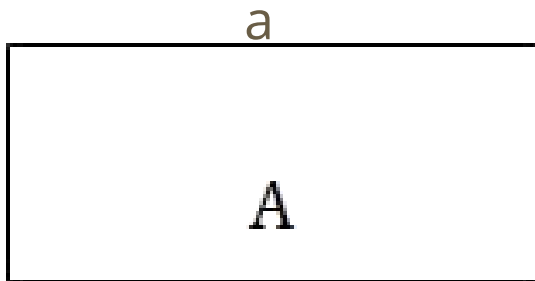
3t cm

2t cm

A

3 cm

B

2 cm
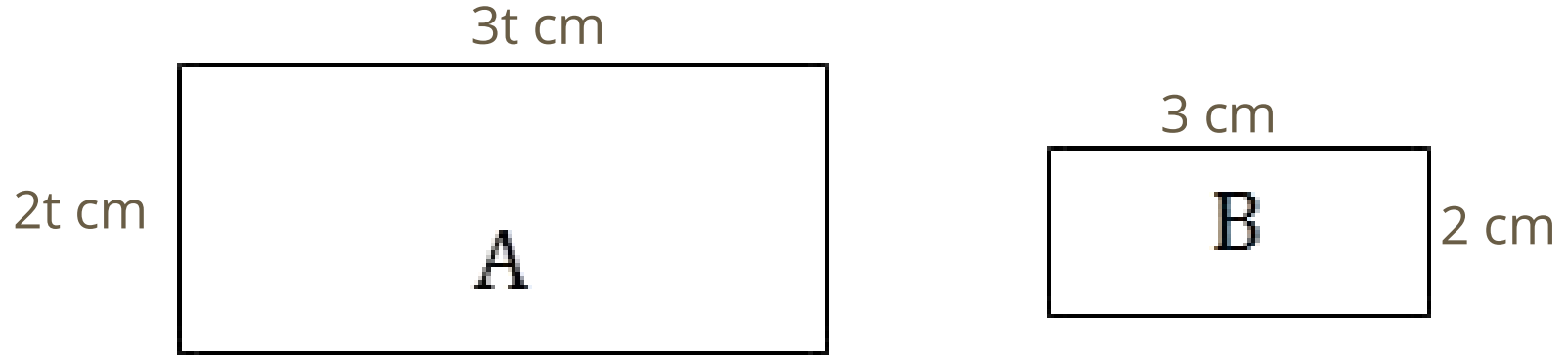
$$\frac{Area\ of\ A}{Area\ of\ B} = \frac{6t^2}{6} = t^2$$

Perimeters of Similar Polygons

If two polygons are similar then:

$$\frac{\text{Perimeter of polygon } A}{\text{Perimeter of polygon } B} = \frac{a}{b}$$
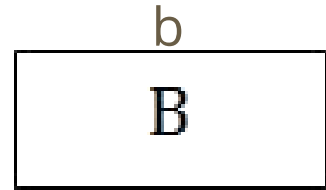
a

A

b

B

Areas of Similar Polygons

If two polygons are similar with the lengths of corresponding sides in the ratio *a:b*, then the ratio of their areas is: $a^2 : b^2$
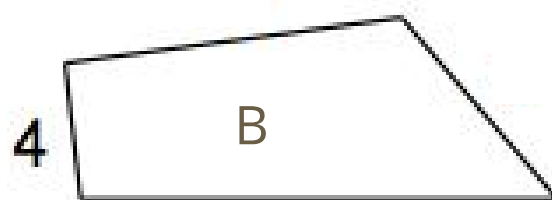
$$\frac{Side\ length\ of\ polygon\ A}{Side\ length\ of\ polygon\ B} = \frac{a}{b}$$

$$\frac{Area\ of\ polygon\ A}{Area\ of\ polygon\ B} = \frac{a^2}{b^2}$$
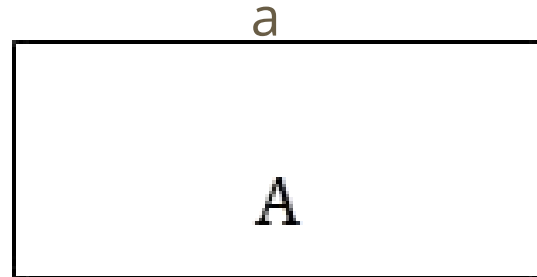
a

A

b

B

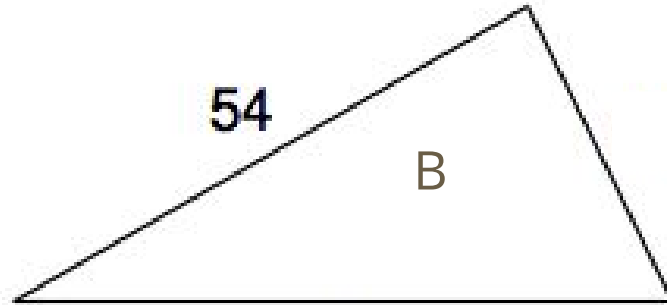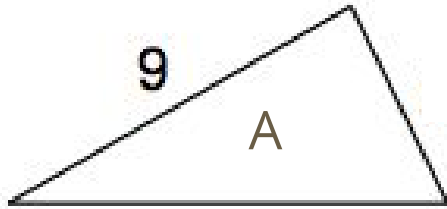Polygon A and B are similar figures.

1. Write the ratio of the perimeters:
2. Write the ratio of areas:

Polygon A and B are similar figures.

1. Write the ratio of the perimeters:
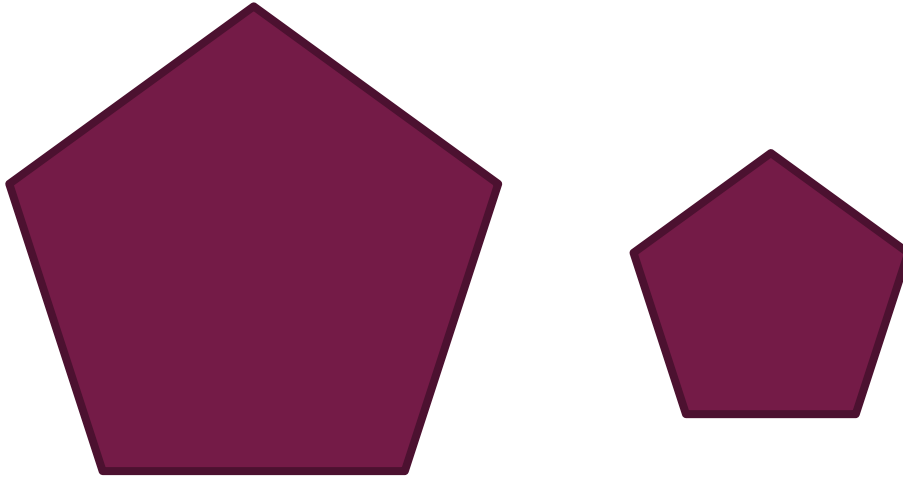2. Write the ratio of areas:

The perimeter of ABC is 16 meters, and its area is 64 square meters.

The perimeter of DEF is 12 meters.

If ABC and DEF are similar triangles, find the ratio of the area of ABC to the area of DEF.
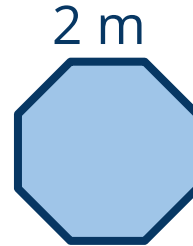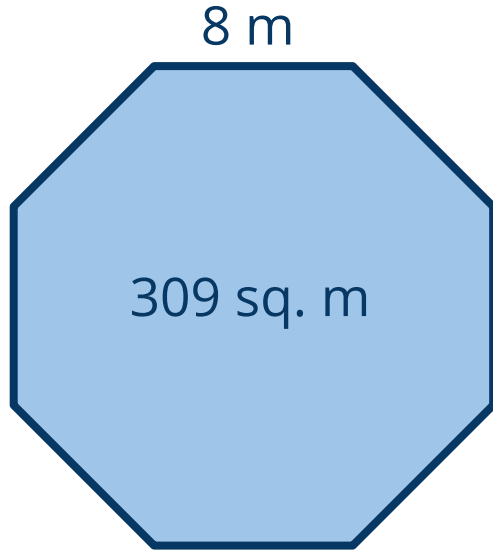
Regular Polygons

Fact: Any two regular polygons with the same number of sides are similar.

These are two regular octagons.

1. Write the ratio of the perimeters:
2. Write the ratio of areas:
3. Find the area of the smaller octagon:

8 m

2 m

309 sq. m

The ratio of the areas of two regular decagons is 20:36. What is the ratio or their corresponding side lengths in simplest radical form?

Rectangles A and B are similar. The perimeter of rectangle A is 66 inches and the Rectangle B is 35 feet long and 20 feet wide. What is the ratio of the areas? Then find the area for rectangle A.

Exit Ticket

1. How is the ratio of the areas of two similar polygons related to the ratio of the corresponding sides?

2. The pentagon in Washington, D.C. is a regular pentagon. Each side of the base is about 900 feet. The area is about 1,400,000 sq. ft.

   If you make a scale model of the Pentagon where the perimeter of the base is 90 feet. What is the area of the base of the model?