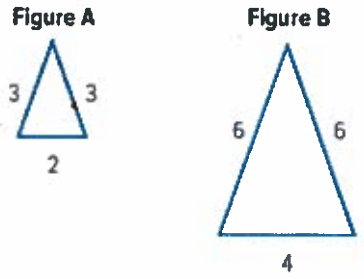
Chapter 9 Lesson 4: Changes in Dimension

Changing Dimensions Affects the Perimeter:

Words If the dimensions of a polygon are multiplied by x, then the perimeter of the polygon changes by a factor of x.

Model



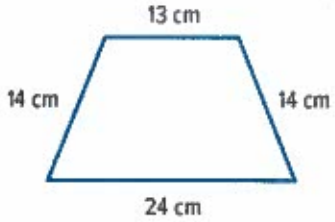
Example The dimensions of Figure A are multiplied by 2 to produce the dimensions of Figure B.

$$\underbrace{\text{perimeter of Figure A}}_{8} \cdot 2 = \underbrace{\text{perimeter of Figure B}}_{16}$$

$$\cdot 2 =$$

EXAMPLES:

Suppose the side lengths of the trapezoid at the right are multiplied by $\frac{1}{2}$. What effect would this have on the perimeter? Justify your answer.



Old Perimeter = 14 + 13 + 24 + 14 = 65 cm

new Perimeter = 7 + 6.5 + 12 + 7 = 32.5 cm

Justify = the original perimeter was 65 cm. If the perimeter was multiplied by $\frac{1}{2}$ the new perimeter would get smaller, and the new perimeter would be 32.5.

65 cm ÷ 32.5 cm = $\frac{1}{2}$

$\frac{1}{2} \cdot 14 = 7$

$\frac{1}{2} \cdot 13 = 6.5$

$\frac{1}{2} \cdot 24 = 12$

$\frac{1}{2} \cdot 14 = 7$

Changing Dimensions Effect the Area

Words If the dimensions of a polygon are multiplied by x, then the area of the polygon changes by $x \cdot x$ or x^2.

Model

Figure A

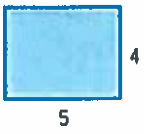
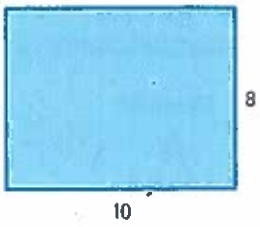


Figure B



Example The dimensions of Figure A are multiplied by 2 to produce the dimensions of Figure B.

area of Figure A $\cdot 2^2$ = area of Figure B

20 $\cdot 4$ = 80

Because area is squared, you multiply by a squared.

Your answer will be what you scaled squared.

EXAMPLES:

A rectangle measures 2 feet by 4 feet. Suppose the side lengths are multiplied by 2.5. What effect would this have on the area? Justify your answer.

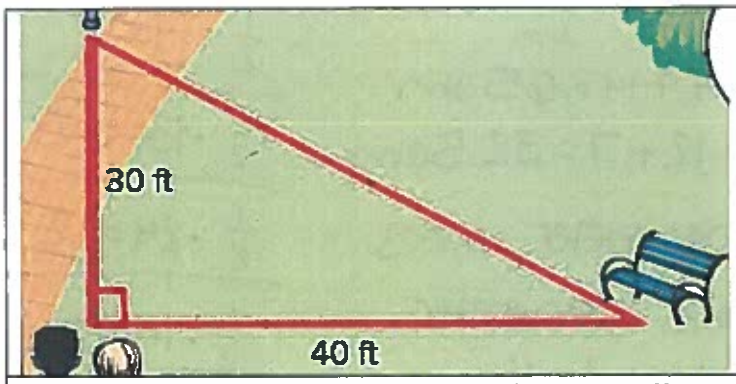
Justify

$A = bh$
$A = 2 \cdot 4$
$A = 8ft^2$
OLD

$A = 8 \cdot 2.5^2$
$A = 8 \cdot 6.25$
$A = 50ft^2$
NEW

The original area is $8ft^2$ and the area of the new shape is $50ft^2$ or 2.5^2 (6.25) times bigger.

$50ft^2 \div 8ft^2 = 6.25$



What is the area of the triangle?

$A = \frac{1}{2}bh$
$A = \frac{1}{2}(40)(30)$
$A = 20(30)$
$A = 600ft^2$

What is the new area if the sides are all two times longer?

$A = 600 \cdot 2^2$
$A = 600 \cdot 4$
$A = 2,400ft^2$