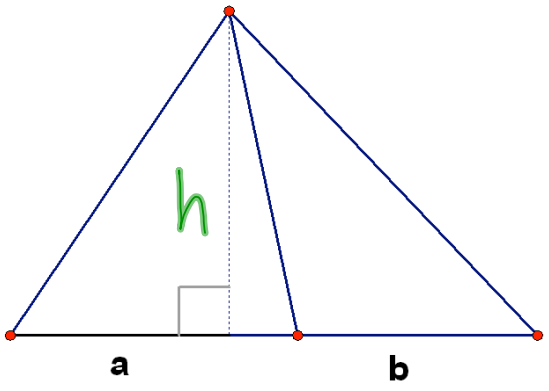
Ratio of Areas

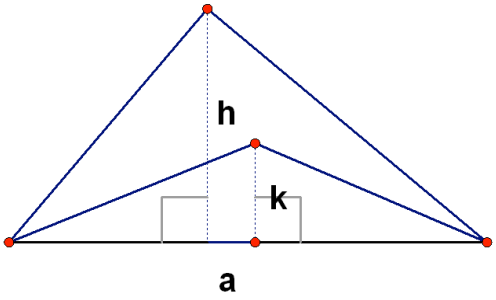
What is the ratio of the areas of two triangles if they have the same height?



$$\frac{\frac{1}{2}ah}{\frac{1}{2}bh} = \frac{a}{b}$$

ratio of bases

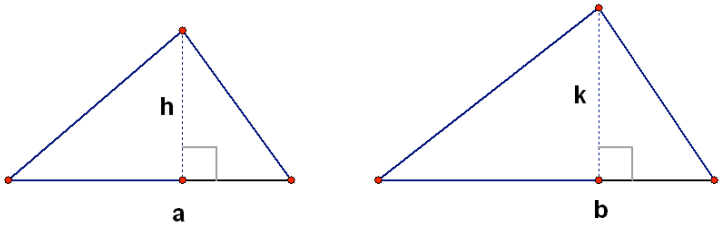
What is the ratio of the areas of two triangles if they have the same base?



$\frac{\frac{1}{2}ah}{\frac{1}{2}ak} = \frac{h}{k}$

ratio of heights

What is the ratio of the areas of two similar triangles?



$\frac{a}{b} = \frac{h}{k}$

$\frac{\frac{1}{2}ah}{\frac{1}{2}bk} = \frac{ah}{bk}$

$= \frac{a}{b} \cdot \frac{h}{k} = \frac{a}{b} \cdot \frac{a}{b}$

$= \frac{a^2}{b^2}$

scale factor^2

$(SF)^2$

Discoveries:

1. If 2 triangles have equal height, then ratio of their areas is the ratio of their bases.

2. If 2 triangles have equal bases, then ratio of their areas is the ratio of their height.

3. If 2 triangles are similar, then ratio of their areas is the square of the scale factor.

For all similar figures, if the scale factor is a : b

- **The perimeter ratio (PR) is:**

$a : b$

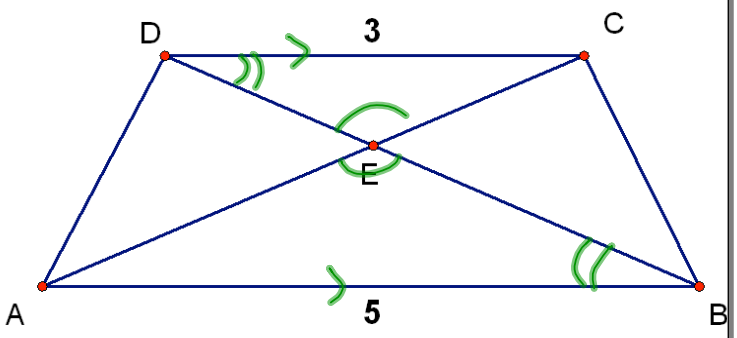
- **The area ratio (AR) is:**

$a^2 : b^2$

Find the ratio of the areas of:

ABCD is a trapezoid.

$\triangle CED$ and $\triangle AEB$

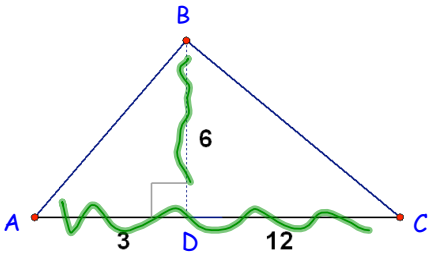


SF = 3/5

AR = 9/25

$\triangle EAB$ and $\triangle DAB$

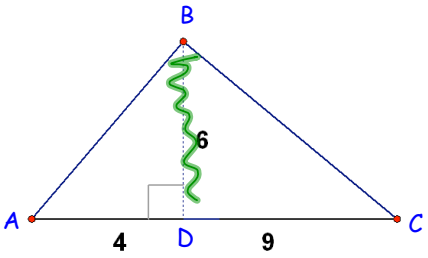
Find the ratio of the areas.



$\triangle ABC : \triangle ADB$

15 : 3

5 : 1



$\triangle ABD : \triangle BCD$

4 : 9

4/9

True or False.

If the ratio of the perimeters of two rectangles is 4:7, then the ratio of their areas must be 16:49.

False

If two quadrilaterals are similar, then their areas must be in the same ratio as the square of the ratio of their perimeters.

Scale Factor	1:3	1:5	3:4	2:3				
Ratio of Perimeters					4:5	3:5	16:49	
Ratio of Areas								36:25

Two similar rectangles have bases of 4 and 7. The area of the smaller rectangle has area of 28 un^2, what is the area of the larger rectangle.

AR = actual areas

$SF = \frac{4}{7}$ $AR = \frac{16}{49}$ $\frac{16}{49} = \frac{28}{x}$