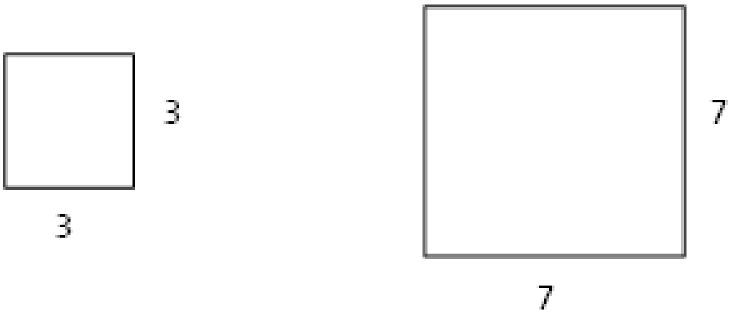


1. Find the ratio of the sides of the squares (smaller to larger) 3 to 7, $\frac{3}{7}$, 3:7
2. Find the ratio of the perimeters of the squares (smaller to larger) 12:28 → 3:7
3. Find the ratio of the areas of the squares (smaller to larger) 9:49 →
4. What do you notice?

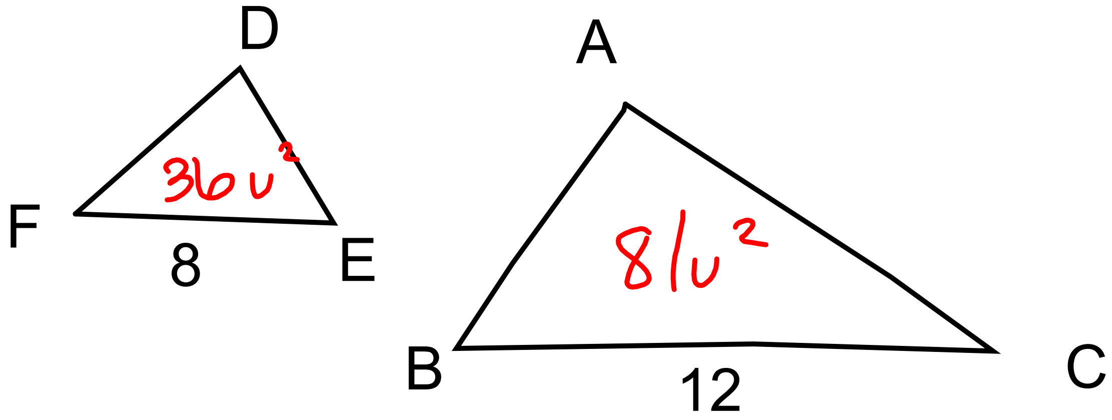
Index Card

SIMILAR

Similar-Figures Theorem: If two figures are ~~similar~~, then the ratio of their areas equals the square of the ratio of corresponding segments.

$$\frac{A_1}{A_2} = \left(\frac{s_1}{s_2}\right)^2$$

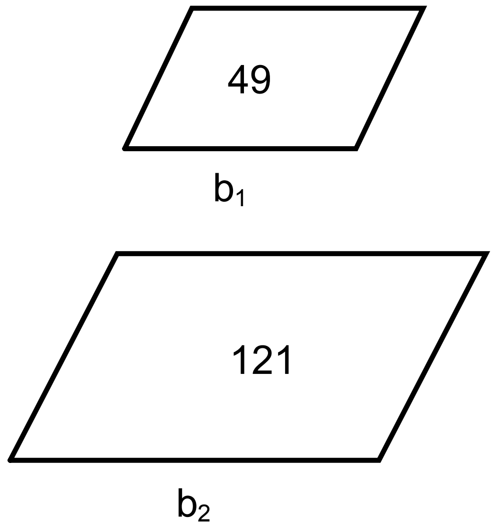
Where A_1 and A_2 are areas and s_1 and s_2 are measures of corresponding sides.



Triangles ABC and DEF are similar.
Find the ratio of their areas.

$$\frac{A_1}{A_2} = \left(\frac{S_1}{S_2}\right)^2 = \left(\frac{8}{12}\right)^2 = \left(\frac{2}{3}\right)^2 = \boxed{\frac{4}{9}}$$

If the ratio of the areas of two similar parallelograms is 49:121, find the ratio of their bases.



$$\sqrt{\frac{49}{121}} = \sqrt{\left(\frac{S_1}{S_2}\right)^2}$$

$$\frac{7}{11} = \frac{S_1}{S_2}$$

What formulas do you know to find the area of a triangle?

1. $A = \frac{1}{2}bh$
2. $A = \frac{1}{2}ab\sin C$
3. $A = \frac{1}{2}ap$

When is each of the above formulas used?

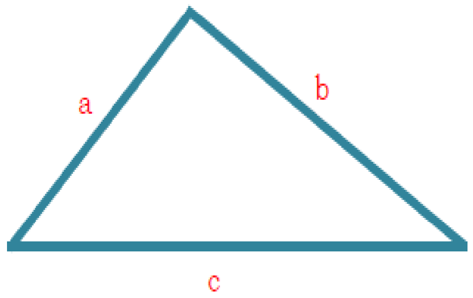
What if we have a different situation entirely?...

Feb 9-2:43 PM

Theorem **(Hero's Formula)** $A_{\Delta} = \sqrt{s(s-a)(s-b)(s-c)}$,

where a, b, and c are the lengths of the sides of the triangle

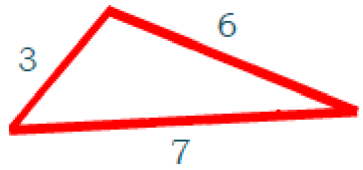
and s = semiperimeter = $\frac{a+b+c}{2}$



Can be used to find the area of a triangle when given SSS!

Feb 8-3:26 PM

find the area of a triangle with sides 3, 6, and 7.



Step 1: Find the perimeter → 16

Step 2: Find the semiperimeter → $\boxed{8}$

Step 3: Replace variables in Hero's formula using corresponding values and evaluate!

$$A = \sqrt{8(8-3)(8-6)(8-7)}$$

$$A = \sqrt{8(5)(2)(1)}$$

$$A = \sqrt{80}$$

80 → 40, 2
40 → 20, 2
20 → 5, 4
4 → 2, 2

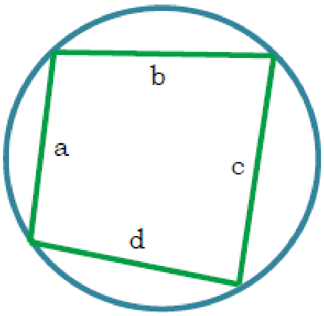
$$2 \cdot 2\sqrt{5}$$

$$4\sqrt{5}$$

Area of Cyclic Quadrilaterals

A Hindu mathematician named **Brahmagupta** recorded a formula for deriving the area of an ***inscribed quadrilateral*** in about 628 A.D. Brahmagupta's formula can only be applied to quadrilaterals that are ***cyclic quadrilaterals***, meaning quadrilaterals that can be inscribed in circles.

Theorem (Brahmagupta's formula)



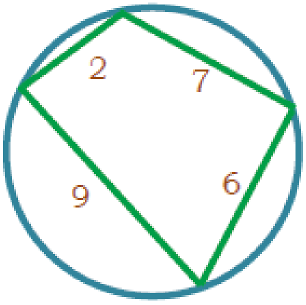
$$A_{cyclic\ quad} = \sqrt{(s-a)(s-b)(s-c)(s-d)},$$

where a, b, c, and d are the sides of the quadrilateral

and s = semiperimeter = $\frac{a+b+c+d}{2}$

Feb 9-2:48 PM

find the area of a cyclic quadrilateral



Step 1: Find the perimeter → 24

Step 2: Find the semiperimeter → 12

Step 3: Substitute corresponding values into Brahmagupta's formula and evaluate.

$$A = \sqrt{(12-2)(12-7)(12-9)(12-6)}$$

$$= \sqrt{10 \cdot 5 \cdot 3 \cdot 6}$$

$$= \sqrt{900}$$

$$\boxed{= 30}$$

Homework

~~Classwork~~

- ~~Stations~~
- p. 547 #4 - 8, 11 ~~-~~, 13, 15, 16

~~Homework~~

- ~~Watch Volume video~~
- ~~Make index cards~~