

4/16 Aim: Angle bisector theorem
 Do now: Get calculator
 Do the opening exercise
 Homework: TBA

Mar 10-7:28 AM

1. Using the two similar squares below answer the following questions and leave your ratio in simplest form:

a) What is the ratio of the sides?
 $2:5$

b) What is the area of square ABCD?
 $2 \cdot 2 = 4$

c) What is the area of square A'B'C'D'?
 $5 \cdot 5 = 25$

d) What is the ratio of the areas?
 $4:25 = (2)^2:(5)^2$

e) What is the perimeter of square ABCD?
 8

f) What is the perimeter of square A'B'C'D'?
 20

g) What is the ratio of the perimeters?
 $8:20 = 2:5$

h) What is the volume of the small cube?
 $2 \cdot 2 \cdot 2 = 8$

i) What is the volume of the large cube?
 $5 \cdot 5 \cdot 5 = 125$

k) What is the ratio of the volumes?
 $8:125 = (2)^3:(5)^3$

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2. Using the two similar triangles below answer the following questions and leave your ratio in simplest form:

a) What is the ratio of the sides?

b) What is the area of ABC?

c) What is the area of A'B'C'?

d) What is the ratio of the areas?

e) What is the perimeter of ABC?

f) What is the perimeter of A'B'C'?

g) What is the ratio of the perimeters?

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CONCLUSION!!

** For all polygons the ratio of the perimeters is equal to _____
 $\text{ratio of the sides}$

** For all polygons the ratio of the areas is equal to _____
 $(\text{ratio of the sides})^2$

** For all polygons the ratio of the volumes is equal to the _____
 $(\text{ratio of the sides})^3$

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1. If the ratio of the sides of two squares is 1:4, what is the ratio of the areas of the two squares?
 $1^2:4^2 = 1:16$

2. If the ratio of the perimeters of two regular polygons is 7:9, what is the ratio of the sides of the regular polygon?
 $7:9$

3. If the ratio of the areas of two regular polygons is 49:25, what is the ratio of the perimeters of the two regular polygons?
 ratio of area: $49:25$
 perimeter: $\sqrt{49}:\sqrt{25}$
 $7:5$

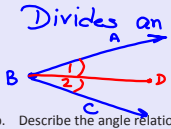
Apr 16-8:56 AM

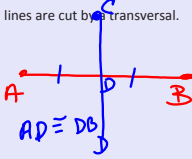
4. If the ratio of the perimeters of two rectangles is 10:12, what is the ratio of the areas of the two rectangles?
 $10:12$
 $10^2:12^2 = 100:144$

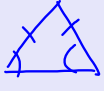
5. If the ratio of the sides of two similar rectangular prism is 4:7 what is the ratio of the volumes of the two prisms?
 $4^3:7^3 = 64:343$

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Opening Exercise

a. What is an angle bisector?
 Divides an angle into 2 \cong \angle 's

 $\angle D$ bisect $\angle ABC$
 $\angle 1 \cong \angle 2$

b. Describe the angle relationships formed when parallel lines are cut by a transversal.
 \cong alternate interior \angle 's
 \cong corresponding angles
 \cong alternate exterior \angle 's

 $AD \cong DB$

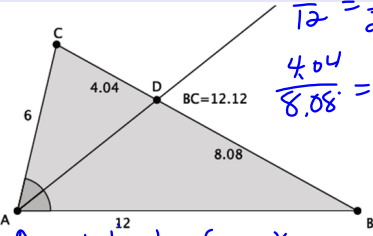
c. What are the properties of an isosceles triangle?

 two \cong sides
 two \cong base \angle 's

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https://www.youtube.com/watch?v=PIY3e_9JUA

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Discussion:
 In the diagram below, the angle bisector of $\angle A$ in triangle ABC meets side BC at point D. Does the angle bisector create any observable relationships with respect to the side lengths of the triangle?

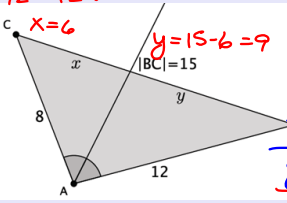


$\frac{6}{12} = \frac{1}{2}$ $\frac{6}{4.04} = \frac{12}{8.08}$
 $\frac{4.04}{8.08} = \frac{1}{2}$ $48.48 = 48.48$

An angle bisector of an \angle in a \triangle divides the opposite sides in two segments that are proportional to the other two sides of the \triangle .

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1. The sides of a triangle are 8, 12, and 15. An angle bisector meets the side of length 15. Find the lengths x and y. Explain how you arrived at your answers.



$\frac{6}{8} = \frac{9}{12}$
 $72 = 72 \checkmark$

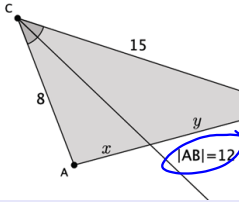
$\frac{x}{8} = \frac{y}{12}$ $y = 15 - x$

$12x = 8y$
 $12x = 8(15 - x)$
 $12x = 120 - 8x$
 $+8x$ $+8x$

$20x = 120$
 $\frac{20x}{20} = \frac{120}{20}$
 $x = 6$

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2. The sides of a triangle are 8, 12, and 15. An angle bisector meets the side of length 12. Find the lengths x and y.

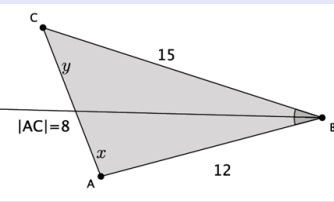


$\frac{8}{x} = \frac{15}{y}$ $y = 12 - x$
 $x = \frac{15}{12 - x}$
 $8(12 - x) = 15x$
 $96 - 8x = 15x$
 $+8x$ $+8x$

$96 = 23x$ $x = 4.174$
 23 23 $y = 12 - 4.174$
 $y = 7.826$

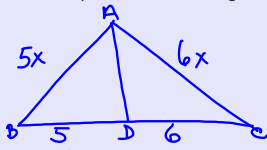
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3. The sides of a triangle are 8, 12, and 15. An angle bisector meets the side of length 8. Find the lengths x and y.



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4. The angle bisector of an angle splits the opposite side of a triangle into lengths 5 and 6. The perimeter of the triangle is 33. Find the lengths of the other two sides.



$$5x + 5 + 6 + 6x = 33$$

$$11x + 11 = 33$$

$$11x = 22$$

$$x = 2$$

$P = 33$
 $x = \text{scale factor}$

$$AB = 5(2) = 10$$

$$AC = 6(2) = 12$$

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problem set

1. The sides of a triangle have lengths of 5, 8, and $6\frac{1}{2}$.

An angle bisector m meets the side of length $6\frac{1}{2}$.

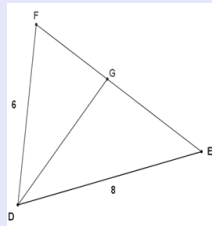
Find the lengths x and y .

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2. The sides of a triangle are $10\frac{1}{2}$, $16\frac{1}{2}$, and 9. An angle bisector meets the side of length 9. Find the lengths x and y .

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3. In the diagram of triangle DEF below, DG is an angle bisector, $DE = 8$, $DF = 6$, and $EF = 8\frac{1}{6}$. Find FG and EG .



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