Module 9a: Area & Medians of a Triangle

Math Practice(s):

-Model with mathematics.

-Look for & express regularity in repeated reasoning.

Learning Target(s):

- Explain the differences between the altitude & median of a triangle.

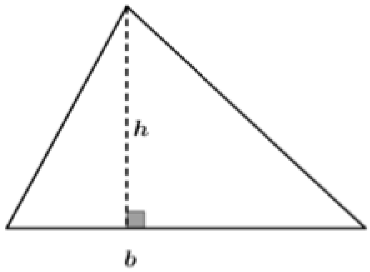
Homework:

HW#1: 9a #1-3

Nov 20-12:32 PM

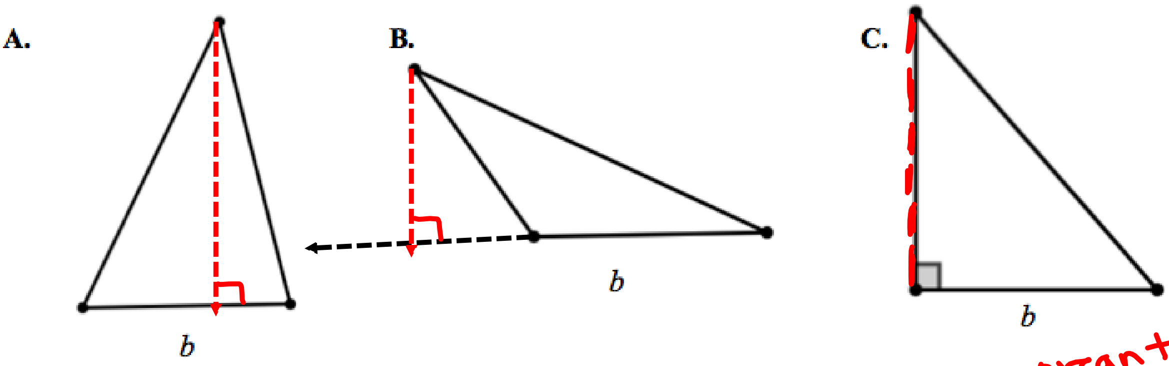
Warm-up

1. State the formula for finding the area of a triangle:



$A = \frac{1}{2}bh = \frac{bh}{2}$

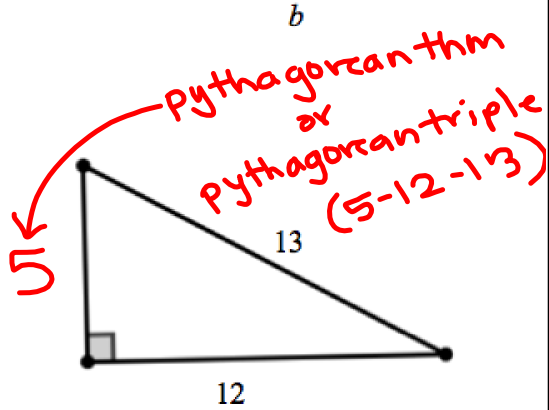
2. For each of the following triangles, draw a dashed line to represent the altitude of the triangle (in relation to the side of the triangle labeled as the base, *b*.



3. Determine the area of the triangle to the right.

$A = \frac{1}{2}(12)(5)$

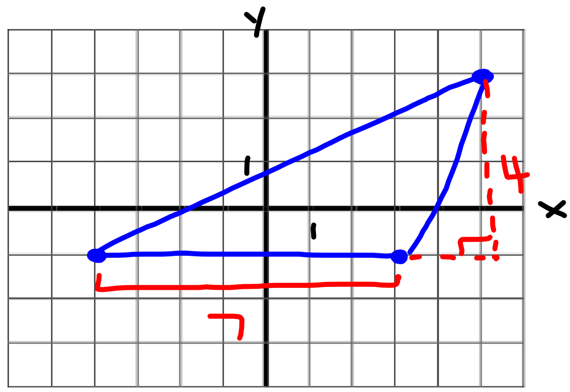
$\boxed{A = 30 \text{ units}^2}$



4. Draw the triangle whose vertices are at (–4, –1), (3, –1) and (5, 3). Then, use the area formula to determine the area of this triangle.

$A = \frac{1}{2}(7)(4)$

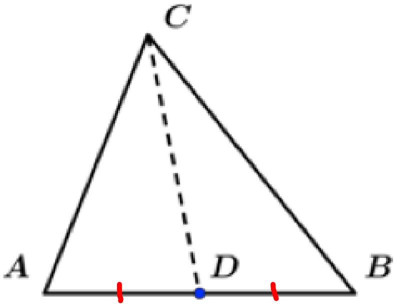
$\boxed{A = 14 \text{ units}^2}$



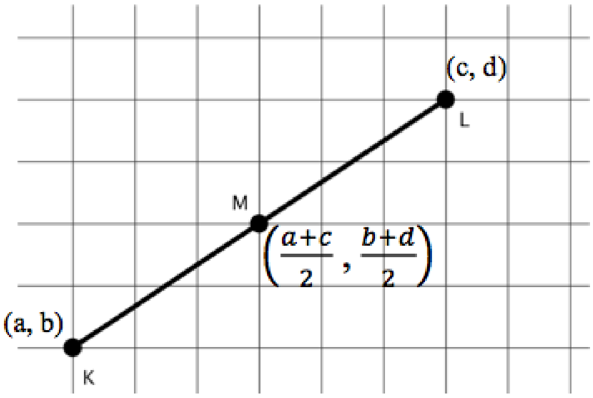
b=7 h=4

Reviewing Medians of a Triangle and the Midpoint Formula

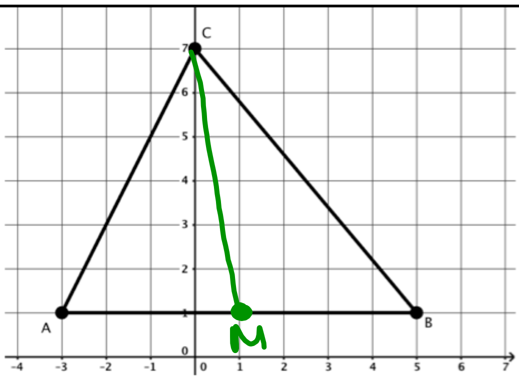
- Given triangle ΔABC, the ***median*** is a segment from a vertex to the midpoint of the opposite side.
  - D is the ___midpoint___ of $\overline{AB}$
  - $\overline{CD}$ is the ___median___ of ΔABC from point C.



- If points K and L are located in the coordinate plane with K = (a, b) and L = (c, d), then the **MIDPOINT** of $\overline{KL}$ is located at $M = \left(\frac{a+c}{2}, \frac{b+d}{2}\right)$.



- It's a little easier to makes sense of the midpoint formula by thinking of it this way:
  - The midpoint, M, is simply the coordinates of some point: (x, y).
  - The x-coordinate of the midpoint is the average of the x-coordinates of the endpoints.
  - The y-coordinate of the midpoint is the average of the y-coordinates of the endpoints.



5. Use the diagram above (ΔABC drawn in the coordinate plane) to answer the following questions.

A. Determine the area of ΔABC

$A = \frac{(8)(6)}{2}$ $\boxed{A = 24 \text{ units}^2}$

B. Draw the median of ΔABC from point C. Label the midpoint point M.

C. Use the midpoint formula to determine the coordinates of M.

A(-3,1) B(5,1)

$M = \left(\frac{-3+5}{2}, \frac{1+1}{2}\right) = \left(\frac{2}{2}, \frac{2}{2}\right) = \overset{M}{(1,1)}$

D. Notice that the median cuts the original triangle into 2 smaller triangles: ΔACM and ΔBCM. Determine the area of BOTH of these triangles.

ΔACM ΔBCM

$= \frac{1}{2}(4)(6)$ $= \frac{1}{2}(4)(6)$

A = 12 units A = 12 units

E. What do you notice about the area of ΔACM and ΔBCM ?

They have the same area.

F. Compare the area of ΔACM to the area of the original triangle ΔABC. Make a conjecture about what the median does to the area of a triangle.

The area of ΔACM is half the area of ΔABC.

The median cuts the Δ in half.