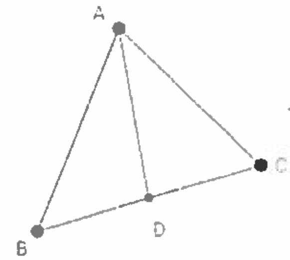
INVESTIGATION 1: MIDPOINTS AND MEDIANS IN TRIANGLES

Conclusion 1
Record the three areas below.

Area ABC (poly1) = _____
Area ABD (poly2) = _____
Area ACD (poly3) = _____



What do you notice about the relationship between the three areas?

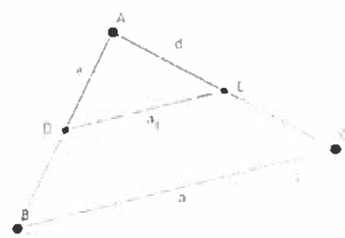
$|\frac{1}{2}\triangle ABC| = |\triangle ABD| = |\triangle ACD|$

Move the vertices A,B, and C around and record your answers below.

Area ABC (poly1) = _____
Area ABD (poly2) = _____
Area ACD (poly3) = _____

Does the relationship still hold? yes.

Conclusion 2A
Record your measures of the length of line BC (a) and the midsegment DE (a_1).



Length of line BC = ______
Length of line DE = ______

What do you notice about the relationship between the lengths of line BC (a) and the midsegment DE (a_1)?

$|DE| = \frac{1}{2}|BC|$

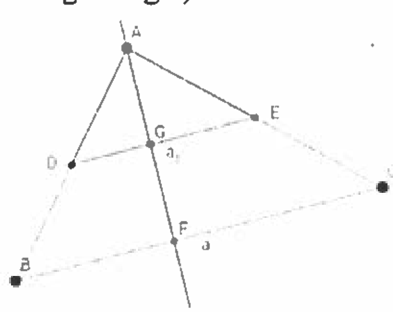
Move the vertices A,B, and C around and record the new measures of BC and DE below.

Length of line BC = ______
Length of line DE = ______

Does the relationship you noticed still hold true? yes.

Conclusion 2B
Record the measures of the two triangle heights (AG – small triangle, and AF – big triangle) below.

Height of triangle ABC (length of AF) = _____
Height of triangle ADE (length of AG) = _____



What do you notice about the relationship between the two heights?

$\frac{1}{2}$ height of $\triangle ABC$ = height $\triangle ADE$

Conclusion 2B (continued)
Move the vertices A,B, and C around and record the new lengths below.

Height of triangle ABC (length of AF) = _____
Height of triangle ADE (length of AG) = _____

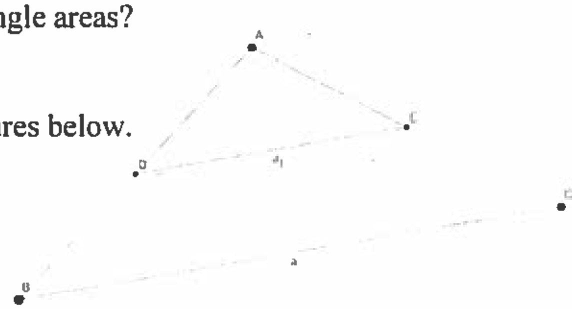
Does the relationship you noticed still hold true? yes.

Conclusion 2C
Record the measure of the areas of the two triangles (ADE – small triangle and ABC – big triangle) below.

Area of ADE = ______
Area of ABC = ______

What do you notice about the relationships between the two triangle areas?

$\frac{1}{4}|\Delta ABC| = |\Delta ADE|$

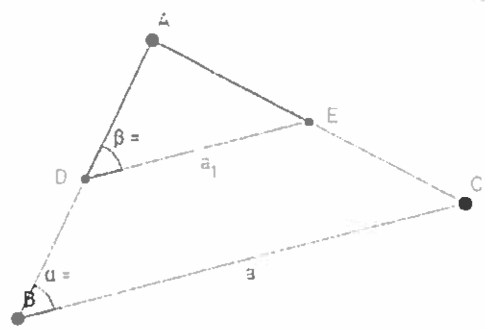


Move the vertices A, B, and C around and record the new measures below.

Area of ADE = ______
Area of ABC = ______

Does the relationship you noticed still hold true? yes.

Conclusion 2D
Record the measures of the two angles below.



Angle ABC = _______
Angle ADE = _______

What do you notice about the relationship between the two angles?

$\angle ABC = \angle ADE$

Move the vertices A,B, and C around and record the new angle measures below.

Angle ABC = _______
Angle ADE = _______

Does the relationship you noticed still hold?

yes.

What can we conclude about the midsegment and the base of the large triangle based on the measures of those angles?

midsegment DE is parallel to BC

SUMMARY of Key Concepts:

TERMINOLOGY

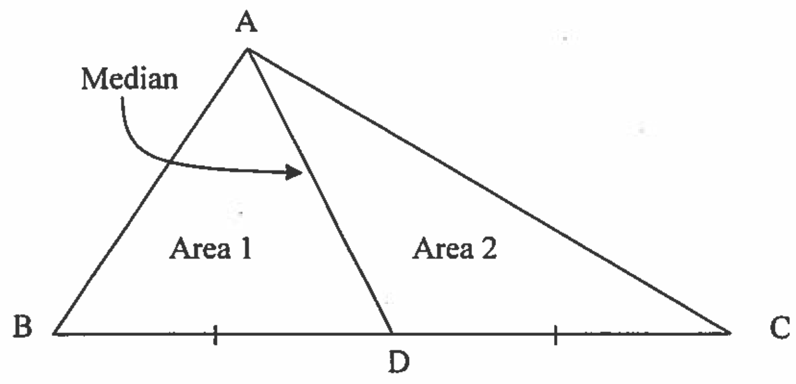
Midpoint: A point that divides a line segment into two equal segments.

Median: the line segment joining a vertex of a triangle to the midpoint of the opposite side.

Bisect: Divide into two equal parts

Right Bisector: A line perpendicular to a line segment passing through its midpoint.

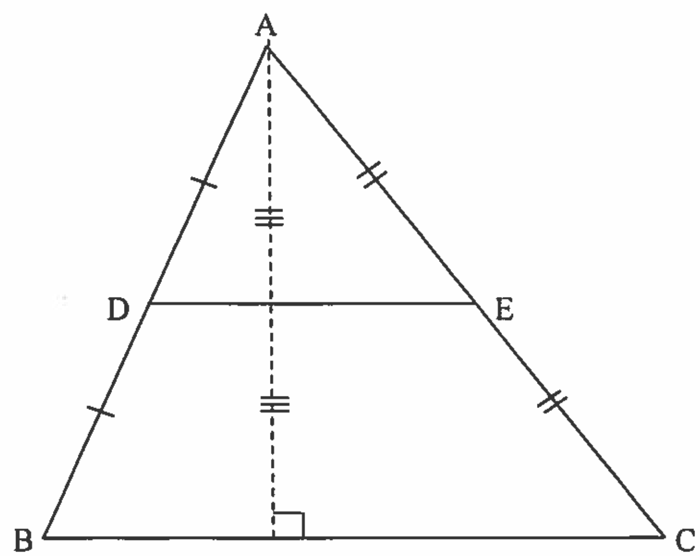
1. The median of a triangle bisects. its area.



Area 1 = Area 2
Area 1 = $\frac{1}{2}$ Area ABC
Area 2 = $\frac{1}{2}$ Area ABC

2. A line segment joining the midpoints of two sides of a triangle is parallel to the third side and is half as long

3. The height of a triangle formed by joining the midpoints of two sides of a triangle is half the height of the original triangle.



4. The area of the triangle formed by joining the midpoints of two sides of a triangle is one quarter the area of the original triangle.

** NOTE: Your homework may ask you to prove something is not true by showing a COUNTER – EXAMPLE. This just means draw an example where you show what they are saying is not true.