1-9: Learning Goals

- Let's write and use a formula to find the area of a triangle.

1-9-1: Bases and Heights of a Triangle
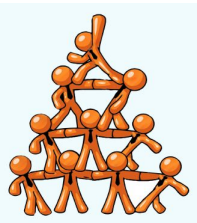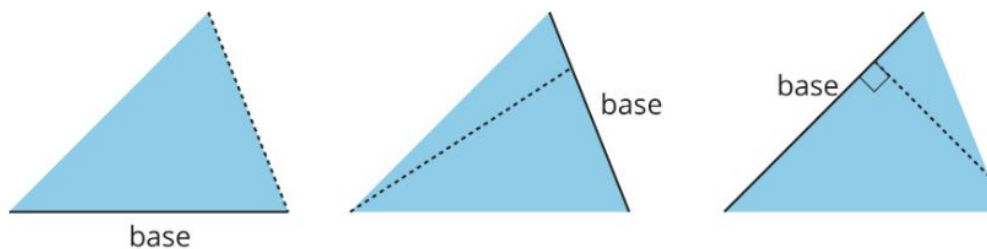
What do you NOTICE?
What do you WONDER?

Study the examples and non-examples of **bases** and **heights** in a triangle. Answer the questions that follow.

- These dashed segments represent heights of the triangle.

base

base

base

base

- These dashed segments do *not* represent heights of the triangle.
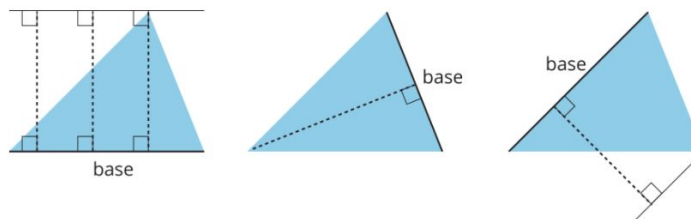
base

base

base
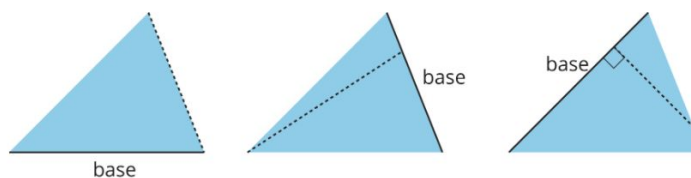
base

1-9-1: Bases and Heights of a Triangle

Study the examples and non-examples of **bases** and **heights** in a triangle. Answer the questions that follow.

- These dashed segments represent heights of the triangle.

- These dashed segments do *not* represent heights of the triangle.


Select **all** the statements that are true about bases and heights in a triangle.

1. Any side of a triangle can be a base.

2. There is only one possible height.

3. A height is always one of the sides of a triangle.

4. A height that corresponds to a base must be drawn at an acute angle to the base.

5. A height that corresponds to a base must be drawn at a right angle to the base.

6. Once we choose a base, there is only one segment that represents the corresponding height.

7. A segment representing a height must go through a vertex.
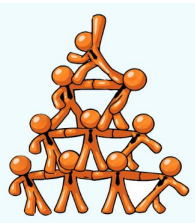
1-9-2: Finding the Formula for the Area of a Triangle

- For each triangle, label a side that can be used as the base and a segment showing its corresponding height.

- Record the measurements for the base and height in the table, and find the area of the triangle. (The side length of each square on the grid is 1 unit.)

- In the last row, write an expression for the area of any triangle using b and h.
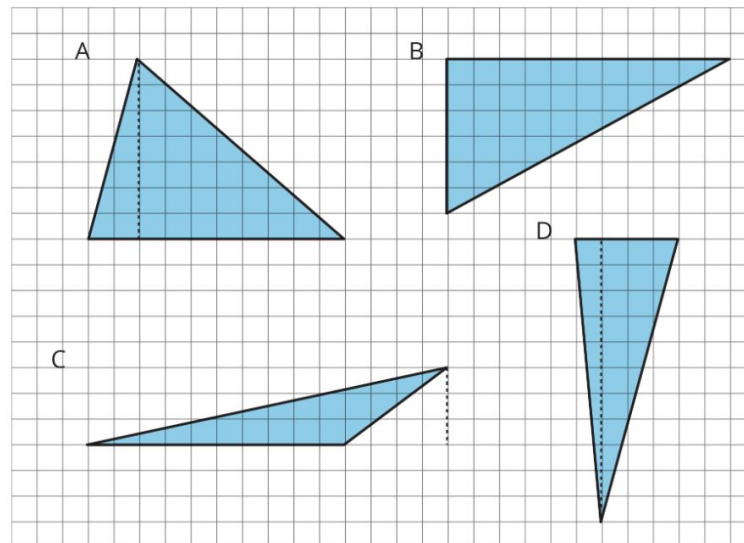
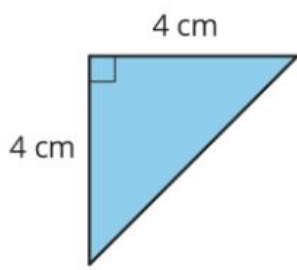| triangle	base (units)	height (units)	area (square units)
A			
B			
C			
D			
any triangle	b	h	
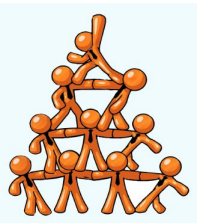
1-9-3: Applying the Formula for Area of Triangles

For each triangle, circle a base measurement that you can use to find the area of the triangle. Then, find the area of any *three* triangles. Show your reasoning.
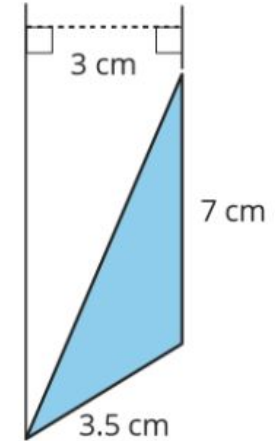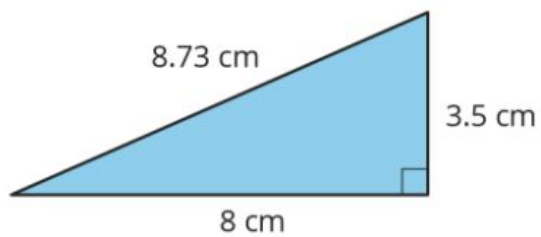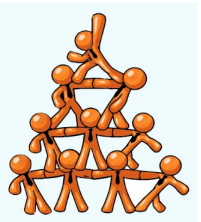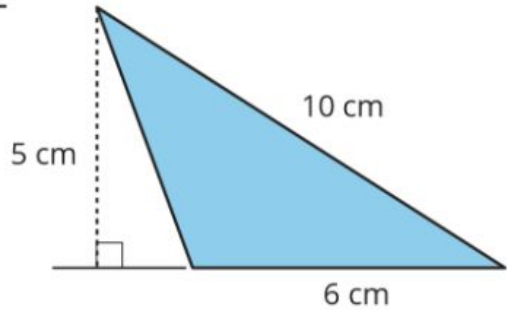
A

B

C
3 cm

4 cm

7 cm

4 cm

6 cm

5 cm

3.5 cm

D

8.73 cm

3.5 cm

8 cm

E

10 cm

5 cm

6 cm
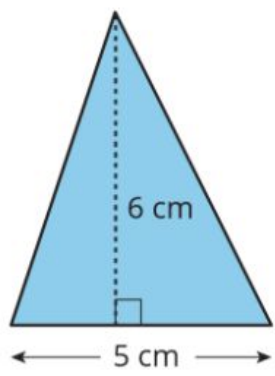
# 1-9: Lesson Synthesis

- How do we locate the **base** of a triangle? How many possible bases are there?

- How do we locate the **height** once we know the base?

- What expression works for finding the area of a triangle?

- Can you explain briefly why this expression or formula works?

- Are there cases in which both the base and the height are sides of the triangle? When does that happen?
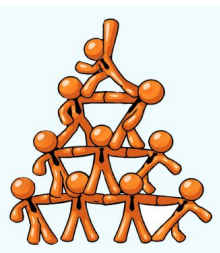
1-9: opposite vertex

When you choose a side to be the base in a triangle, the vertex that is not an endpoint of the base is the opposite vertex.

Point A is the opposite vertex to the base segment BC.
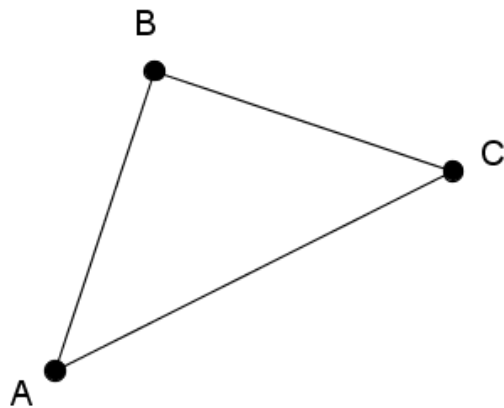
1-9: base/height of a triangle

Any of the three sides of a triangle can be chosen as a base. The term base can also refer to the length of this side. Once we have chosen a base, the corresponding height is the length of a perpendicular segment from the base to the vertex opposite it. The opposite vertex is the vertex that is not an endpoint of the base.
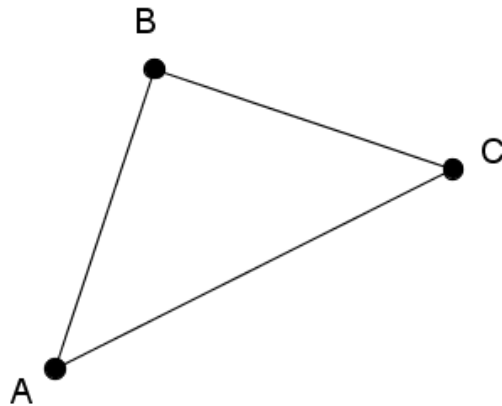
1-9: Learning Targets

- I can use the area formula to find the area of any triangle.

- I can write and explain the formula for the area of a triangle.

- I know what the terms "base" and "height" refer to in a triangle.

1-9-4: Two More Triangles

For each triangle, identify a base and a corresponding height. Use them to find the area. Show your reasoning.

A

7.2 in

6 in

2.5 in

3 in

B

5 cm

5 cm

4 cm

4.8 cm

6 cm