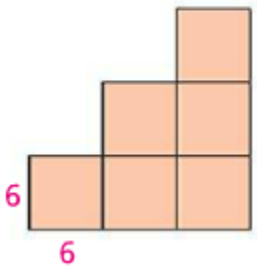
Homework: Investigation 3B **Name:**

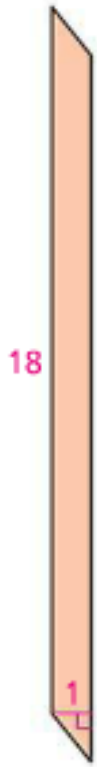
3.07

For Exercises 3–8, find the area of each figure. Assume that sides that look parallel are parallel and angles that appear to be right angles are right angles.

3.



4.



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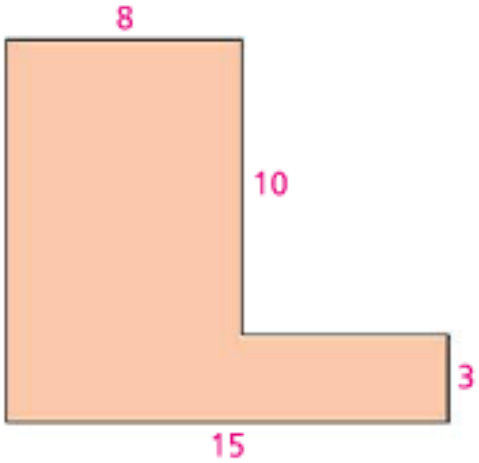
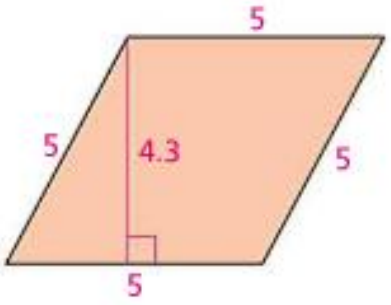
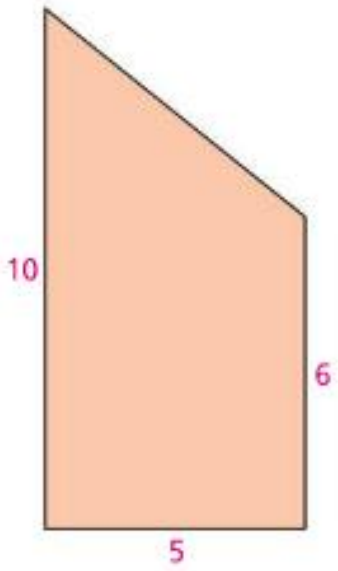


Homework: Investigation 3B **Name:**

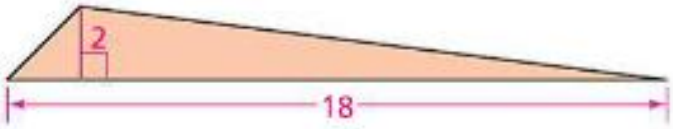
6.



7.



8.



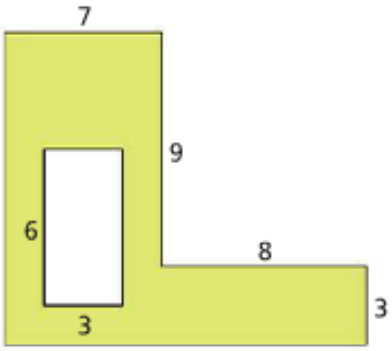
9. **Standardized Test Prep** What is the area of the shaded portion of the figure at the right?

A. 69 square units

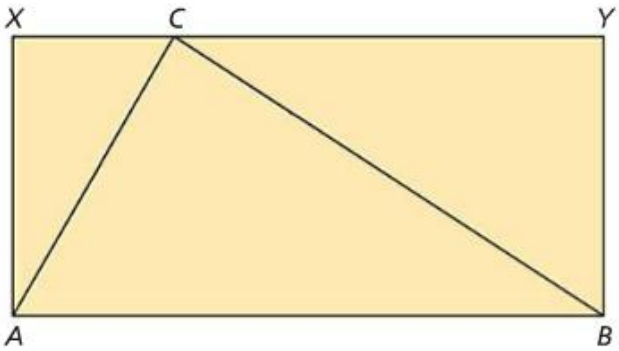
B. 87 square units

C. 90 square units

D. 108 square units



10. In rectangle $ABYX$, is the sum of the areas of $\triangle ACX$ and $\triangle BCY$ greater than, less than, or equal to the area of $\triangle ABC$? Explain.



Homework: Investigation 3B **Name:**

3.08

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7. Decide whether each statement below is true for all cases. If you decide it is *not* generally true, do one of the following.

- State that it is never true.
- State that it can be true for special cases.

Justify your answer with an explanation and examples.

a. Cutting a triangle along a median forms two triangles of equal area.

b. Cutting a triangle along an altitude forms two triangles of equal area.

c. Cutting a triangle along an angle bisector forms two triangles of equal area.

d. If two triangles have congruent angles and equal areas, they are congruent.

e. If two triangles have equal side lengths, they have equal areas.

f. If two triangles have equal areas, then they have equal side lengths.

g. If two triangles have congruent angles, then they have equal areas.

8. Refer to the seven shapes below. Use a ruler to measure for parts (a)–(h). Give reasons for your responses.

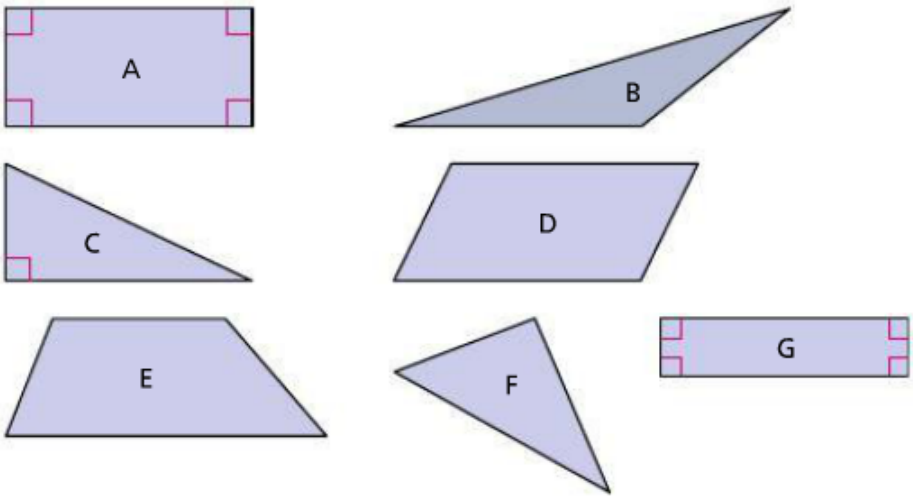
a. Find two shapes with equal areas.

b. Group the shapes by area.

c. Is the area of shape A greater than, less than, or equal to the area of shape D?

Compare the areas of the following pairs of shapes as you did for shapes A and D.

d. A and C **e.** B and C **f.** B and E **g.** F and G **h.** B and G



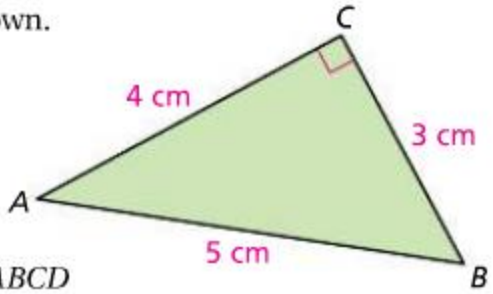
Homework: Investigation 3B **Name:**

9. Give each value for the right triangle shown.

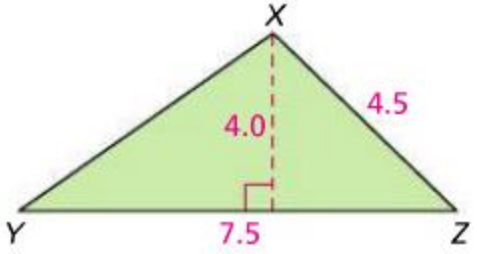
a. the height from vertex A to base $\overline{BC}$

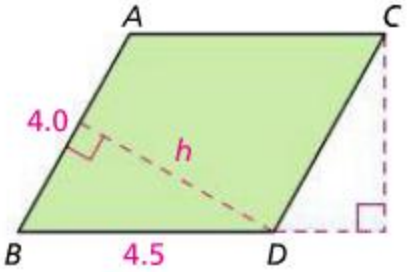
b. the area of the triangle

c. **Take It Further** the height from vertex C to base $\overline{AB}$



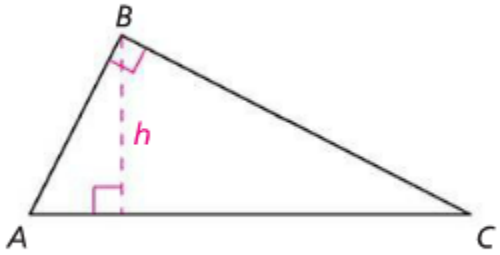
10. **Standardized Test Prep** Parallelogram $ABCD$ and $\triangle XYZ$ have the same area. What is the height h of parallelogram $ABCD$ relative to $\overline{AB}$?





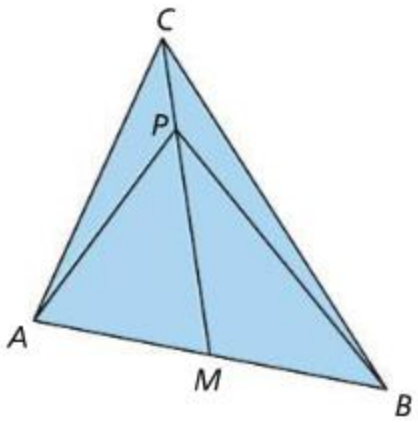
A. $3\frac{1}{3}$ **B.** $3\frac{1}{2}$ **C.** $3\frac{3}{4}$ **D.** $7\frac{1}{2}$

11. In $\triangle ABC$, $m\angle ABC = 90°$ and h is the altitude to base $\overline{AC}$. Compare the quantities $AC \cdot h$ and $AB \cdot BC$.



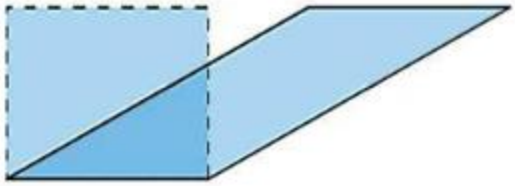
12. Show that for any triangle, the product of the length of a side and the length of the altitude to that side is the same for all three sides.

13. Take It Further $\overline{CM}$ is a median. P is a point on $\overline{CM}$. Show that $\triangle APC$ has the same area as $\triangle PBC$.



In previous exercises, you dissected parallelograms into rectangles without restrictions. Suppose, however as that the rectangle must have a specific base length. The following two exercises address this problem.

14. Take It Further Show how to dissect this parallelogram into a rectangle with the same base and height as shown. Trace the figures and cut them out, or use geometry software.



Habits of Mind

Represent the result. You may find it helpful to draw the desired rectangle. Then try to fill it with pieces of the parallelogram.

15. Take It Further The parallelogram at the right is an extreme example of the one in Exercise 14. Trace and copy it. Then figure out how to dissect it into a rectangle with one side congruent to the shorter side of the parallelogram.