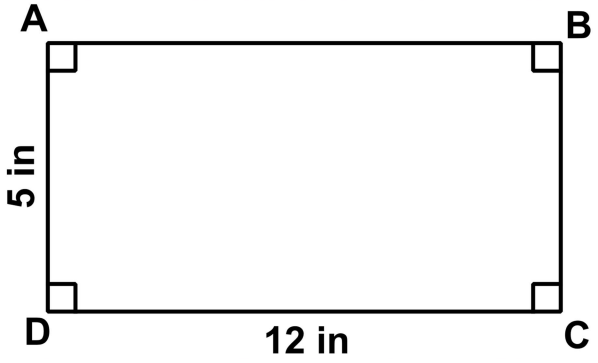
Name: _____ Date: _____

THE AREA OF A TRIANGLE
N-GEN MATH® 6

Triangles, figures with three straight sides, are extremely important in math, art, design, and science. Being able to quickly calculate the **space inside of them**, or their **area**, is important. In this lesson we will review the basics of calculating their area, including the triangle area formula.

***Exercise* #1:** Rectangle ABCD is shown below. Recall that all rectangles have four **right angles** and adjacent sides are **perpendicular** to each other.

(a) What is the area of ABCD? Include appropriate units in your answer.

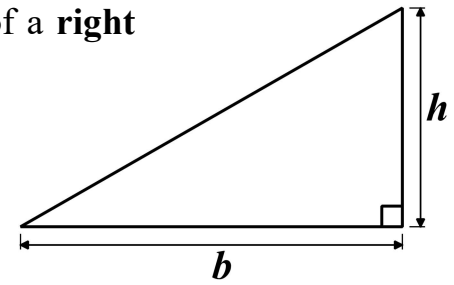


(b) Draw a line segment from point A to point C. Redraw the resulting **right triangle** ACD below.

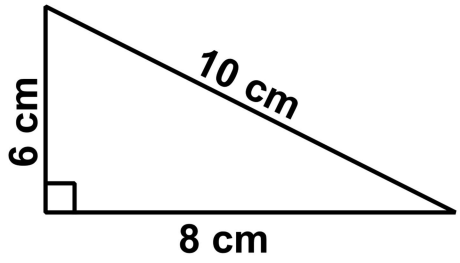
(c) What is the area of triangle ACD? Explain how you determined your answer.

***Exercise* #2:** Based on *Exercise* #1, state a formula for the area of a **right triangle** whose **base** is given by b and whose **height** is given by h.

Area =

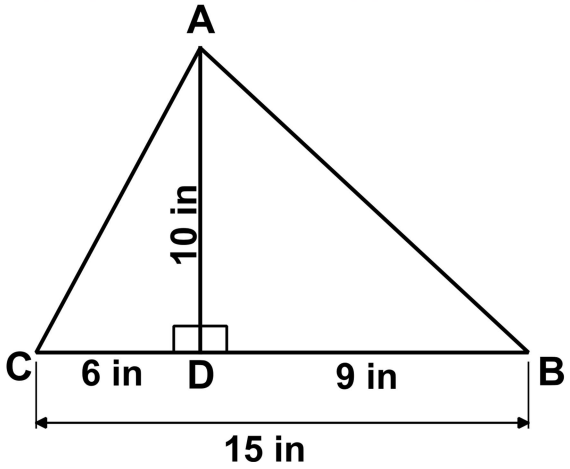


***Exercise* #3:** What is the area of the right triangle pictured below? Include appropriate units.



Since every **right triangle** can be thought of as **half** of a **rectangle** it is easy to determine their areas. But, non-right triangles are more challenging. Let's explore one in *Exercise* #4.

***Exercise* #4:** In triangle ABC below, its base has a length of 15 inches and it has a height of 10 inches. Point D has been located on side $\overline{BC}$ such that two right triangles are created, ABD and ADC.



(a) Find the area of the two right triangles.

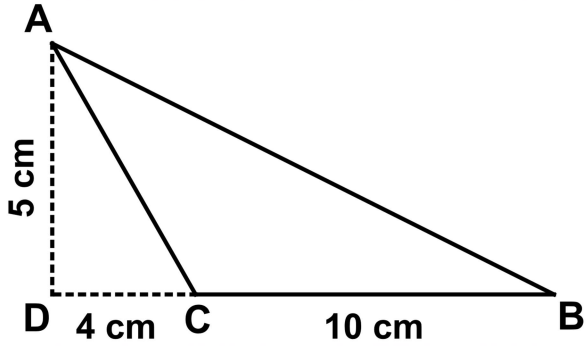
Area of ΔABD: Area of ΔADC:

(b) What must be the area of ΔABC based on (a)?

(c) How could you have calculated the area of ΔABC without breaking it into two right triangles? Show the calculation below.

The area formula for a triangle works even if it is not a right triangle. The big difference is that the **height** is **not one of the side lengths**. Let's verify for one final type of triangle, an **obtuse**.

***Exercise* #5:** An **obtuse triangle** is one that contains an angle **greater than** $90°$. In the diagram below ΔABC is obtuse and has had side $\overline{BC}$ extended to point D such that two right triangles area formed, ΔABD and ΔACD.



(a) Determine the area of both right triangles below.

Area of ΔABD: Area of ΔACD:

(b) Use your answers from (a) to calculate the area of obtuse triangle ABC.

(c) Does the general area formula for triangles still work? Verify!

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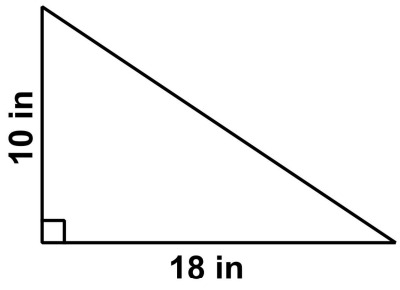
THE AREA OF A TRIANGLE
N-GEN MATH® 6 HOMEWORK

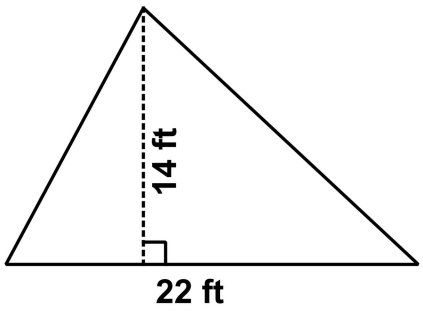
FLUENCY

1. Find the area of each triangle pictured below. Show your calculation and include proper units.

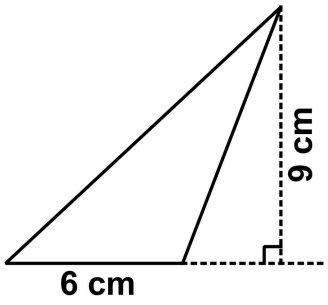
(a)



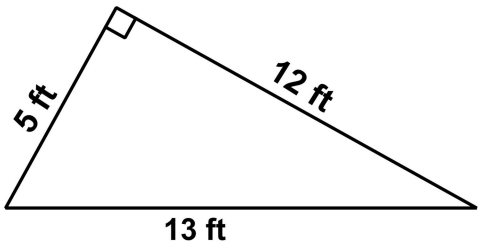
(b)



(c)



(d)



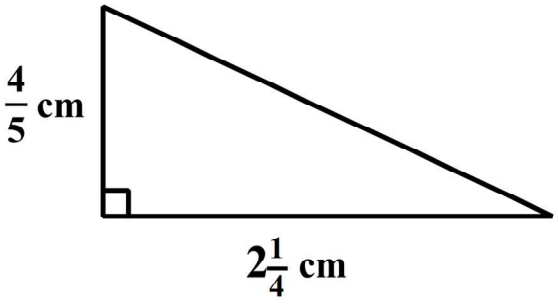
2. Given the right triangle shown below, which of the following is its area in square centimeters? Show the work that leads to your answer.

(1) $\frac{9}{10}$

(2) $\frac{7}{10}$

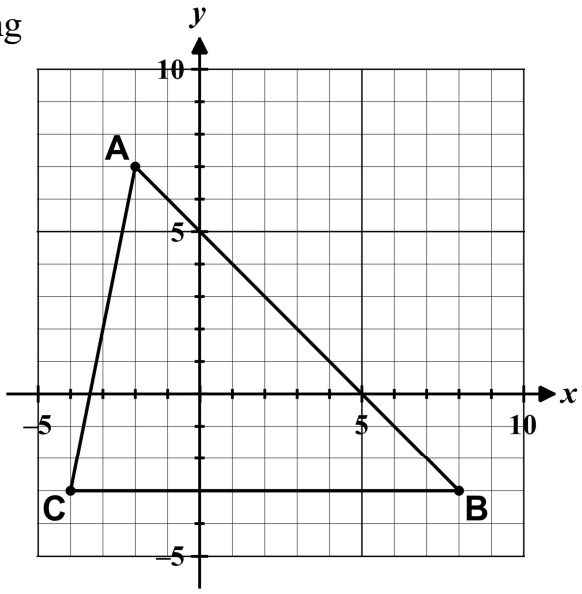
(3) $1\frac{3}{5}$

(4) $8\frac{2}{5}$



_____

3. Triangle ABC is plotted below. Answer the following questions.



(a) State the coordinates of the three vertices.

A(_____, _____)

B(_____, _____)

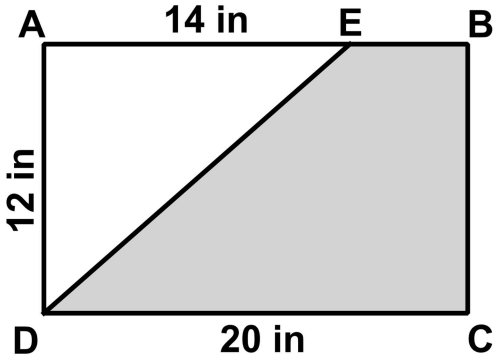
C(_____, _____)

(b) If side $\overline{BC}$ serves as the base, state the length of the height and the base and the area of the triangle.

base = _____ height = _____ Area = _____

USING YOUR MATH

4. Rectangle ABCD is shown to the right. Point E is located on side $\overline{AB}$ such that triangle AED is created.



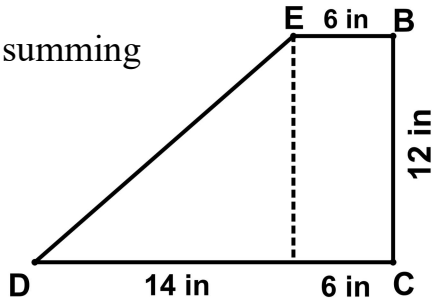
(a) What is the area of rectangle ABCD?

(b) What is the area of triangle AED?

(c) What is the name of figure EBCD, which is shaded in?

(d) Find the area of EBCD using (a) and (b).

(e) If you were only given figure EBCD as shown, find its area by summing the areas of the rectangle and triangle that create it.



Rectangle: Triangle:

Total Area = _____