Advanced Challenge Level 2 Problem #5 _____

Consider triangle XYZ. Let x represent the length of segment YZ, y represent the length of segment XZ, and z represent the length of segment XY. Finally, let s represent the 'semi-perimeter' of the triangle. In other words, s is one-half the perimeter. Do each of the following.

1. Show that the area, A, of triangle XYZ can be found using the following formula.

$$A = \sqrt{s(s-x)(s-y)(s-z)}$$

2. Use this formula, called Heron's Area Formula, to find the area of triangle XYZ given the lengths of the sides in each problem below. Include appropriate units with your answer. Show your work neatly organized. Express any irrational solutions rounded to three significant figures.

a. x = 3 inches ; y = 4 inches ; z = 5 inches

b. x = 5 centimeters ; y = 8 centimeters ; z = 5 centimeters

c. x = 6 feet ; y = 3 feet ; z = 7 feet

d. x = 5 meters ; y = 13 meters ; z = 12 meters

e. x = 20 miles ; y = 18 miles ; z = 10 miles