GSE PreCalculus, Name: ___________________________

Notes: Area of Triangles/Applications of LOS and LOC Date: _____________

Two ways to find the Area of a triangle:

1. $A_{\triangle} = \frac{1}{2}ab\sin C$ ***Given 2 sides and 1 angle – all letters different; a, b = sides, C = angle***

Example: Find the area: p = 6.8 in, k = 16 in, H = 111°

2. *Heron's Area Formula - Given 3 sides of the triangle*

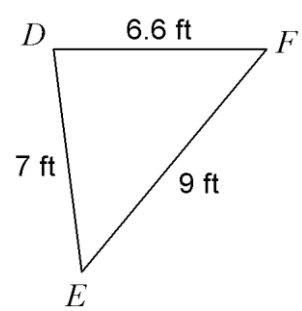
The area of a triangle with sides of length *a*, *b*, and *c* is

$$A_{\triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

Where $s = \frac{1}{2}(a+b+c)$. The variable *s* is called the *semiperimeter*, or half-perimeter, of the triangle

Example: Find the area of the triangle to the right (nearest tenth).

Step 1: Find the semiperimeter:

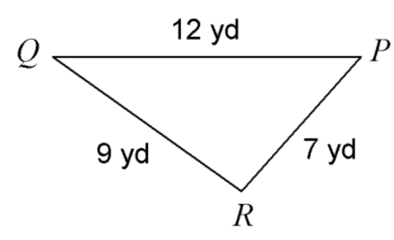


Step 2: Use Heron's formula:

Exercises: **Find the area of the triangle to the nearest tenth (show work).**

1. $x = 14, y = 28, Z = 87^{0}$

2.



Draw a picture and solve.

Example 1: A boat in distress at sea is sighted from two coast guard observation posts, A and B, on the shore. The angle at post A formed by lines of sight to post B and the boat is $41.67°$. The angle at post B formed by the lines of sight to post A and the boat is $36.17°$. The distance from Post A to Post B is 24 km. Find the distance from Post A to the boat.

Example 2: Two ships leave a port at 8:00AM. One travels at a bearing of $N50°W$ at 15 mph and the other travels at a bearing of $S65°W$ at 18 mph. Approximate how far apart they are at noon that day.

Example 3: A boat is sailing due east parallel to the shoreline. At a given time the bearing to the lighthouse is S 50° E. The boat travels 10 miles and the bearing is now S 45° E. Find the distance from the boat to the lighthouse (d)