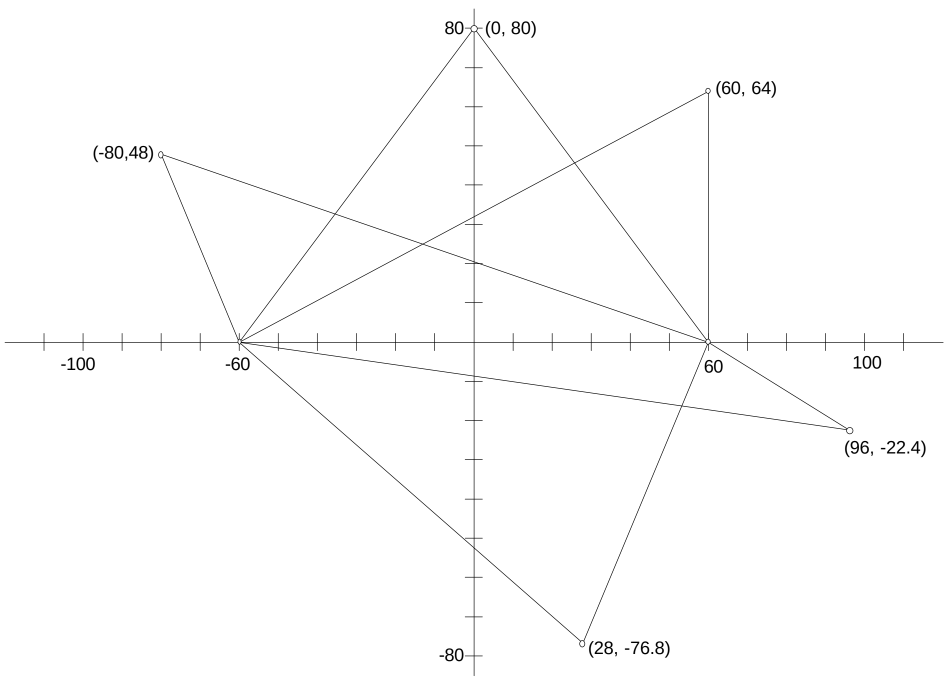
The Search for Fester's Gold

Name________________________
Group________ 9:00 11:00

1. Great news! Sorting through your late Uncle Fester's belongings, you find a treasure map. He buried gold in three locations. The map is so old and torn that you can only make out the coordinates of two of the locations, which you determine are 120 ft. apart. But you are fortunate that old Uncle Fester was fancy with figures. He has written on the map that the three locations form the vertices of a triangle with perimeter 320 ft.

   a. You and your buddy place the two KNOWN locations at the coordinates (± 60, 0).

      Your buddy, fueled by greed, stays up all night and determines five possible locations for the gold by TRIAL! (Whew!)



      Your buddy's five locations are plotted and labeled above. (They all do meet the criterion.) Without performing ANY calculations, plot and label thirteen additional locations where the gold may be buried. Include the triangles. Use a ruler. HINT: See back of last page.

   b. Connect all eighteen plotted points with a smooth curve to graph all possible locations
      REMARK: In the context of this problem, the location of the gold cannot be on the *x*-axis, but let your graph cross the *x*-axis anyway.

   c. Find the equation of your graph. This gives all possible locations (x, y) of the buried gold.

      RUN = _______

      RISE = _______

      EQUATION:

HINT: Check that your equation satisfies $\text{RUN}^2 - \text{RISE}^2 = 60^2$

2. You dig up gold in the two known locations at (60, 0) and (–60, 0), only to find another clue:
In Uncle Fester's handwriting, you find a note which reads:

"Thrice the perimeter is the ar - e - a
of the tri-gon on which they're bur-ie-ud."

You curse Fester's taste in poetry,
but praise your Algebra instructor's taste in showing you the conic sections!

With this, you can narrow down the location of the buried treasure.

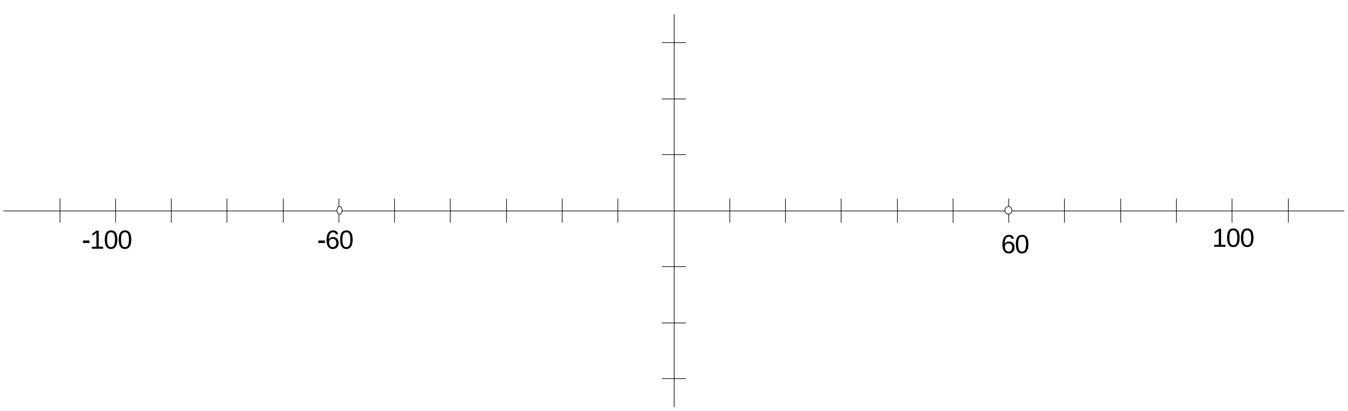
But first…

MORE HINTS:

- Uncle Fester reminds you that $A = \frac{1}{2} base \cdot height$ for a triangle. (He speaks from the grave - and rolls over if you didn't know that.)
- The triangle we want has area $A = 3 \cdot perimeter = 3 \cdot 320 = 960$ square feet.
- None of the eighteen points plotted on the first page are solutions. (Drat!)
However, Uncle Fester suggests you look closely at all of the triangles you drew on the first page.
Answer these questions:
  a. What is true about the base of every triangle you drew? ____________________________________
  b. What is the height of the triangle we want? ______________
  c. State in words how you can determine each of the coordinates of the location point once you know the height of the triangle. ____
  ____
  ____

Ok, now…

Determine where in the first quadrant you would look for the buried treasure: (_________, __________)
Give exact numbers, i.e. no decimal approximations, please. Radicals need not be reduced.
Then plot the first quadrant location and draw the triangle:



Use symmetry to obtain the three additional possibilities. Plot them and draw the triangles.
(_________, __________), (_________, __________), (_________, __________)

3. Respond below what you liked about this problem and state any new discoveries or insights.

<u>Hint to Part 1a:</u>