NOTE: These problems are to be done on Engineering paper, using the standard homework format. You may consult with other students, tutors, or me on this assignment. Questions about these problems will not be answered during class.

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1. Determine the quadrant(s) in which (x, y) is located so that the given information is satisfied.

   a) $y > 0$

   b) $xy < 0$

2. A triangle is *equilateral* if all three sides are of equal length, *isosceles* if exactly two sides are of equal length, and *scalene* if all sides are of different lengths. Use the distance formula to find the length of each side of the triangle with vertices $A(7, 3)$, $B(3, 5)$, and $C(5, -1)$ and determine whether it is equilateral, isosceles, or scalene.

3. a) Sketch the graph of the circle with center at the point $(-3, 1)$ and which is tangent to the horizontal line passing through the point $(6, -4)$.

   [*Note*: A *tangent* to a circle is a line that intersects the circle in **exactly** one point.]

   b) Determine the equation of the circle in part (a).

4. Solve the equation $2x^5 - 3x^4 - 4x + 6 = 0$ in two ways:

   a) Use your graphing calculator to obtain a graph of the corresponding function. Sketch the graph on your paper using the viewing window $[-5, 5] \times [-10, 10]$. Use the ZERO command to estimate the solutions to three decimal place accuracy.

   b) Solve the equation algebraically.

5. The vertices of $\triangle ABC$ are located at the points $A(-6, 1)$, $B(4, 5)$ and $C(2, -3)$.

   a) Sketch $\triangle ABC$ on a coordinate plane and find the midpoints of each of the sides.

   b) Draw segments joining the three midpoints. Choose ONE of those segments and show that it is parallel to (same slope) and half the length of the opposite side of the triangle.