Practice problems

1. Solve $-71x - 35x^2 - 24 = 0$ by using the factoring technique.

2. Determine the number of real solutions to the following equations:
   a. $3x^2 - 3x + 100 = 0$.
   b. $x^2 - 100x + 1 = 0$.

3. Given $P = (1,3)$, and $Q = (-3,5)$, then
   a. find the line equation $l_1$ so that $l_1$ is perpendicular to $PQ$ and passes through $Q$.
   b. find the circle which uses $PQ$ as its diameter.

4. You are a contractor and have purchased a piece of equipment for $26,500. The equipment costs an average of $5.25 per hour for fuel and maintenance, and the operation is paid $9.50 per hour. [Assume the cost and revenue functions are linear functions].
   a. Set up the cost ($C(t)$) and revenue ($R(t)$) functions respectively.
   b. Sketch the graphs of $C(t)$ and $R(t)$ together.
   c. Find the number of hours you must operate the equipment before your break even.

5. You are about to take a trip and you plan to rent a car, here are two rental offers: (i) Hertz will give you 30 cents per mile and $45 per day, and (ii) Avis will give you 25 cents per mile and $50 per day. Suppose you decide to rent a car for 4 days. Which company offers you a better deal? Explain.

6. A manufacturer of electronic components finds that in making $x$ units of a product weekly it has a cost of $3.50 per unit, plus a fixed cost of $2800. Each unit sells for $5.
   a. Find the cost, revenue and profit functions.
   b. Sketch these functions.
   c. Find the break-even point.

7. Set up the equation that relates Celsius and Fahrenheit. Hint: $100^\circ C = 212^\circ F$ and $0^\circ C = 32^\circ F$.

8. Do you know Celsius would meet Fahrenheit at some point? Where?