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 prduct 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: $100$ C $= 212$ F and $0$ C $= 32$ F.
8. Do you know Celsius would meet Fahrenheit at some point? Where?