ECE 111 - Make-Up Homework #2

Week #2: Algebra - Due Friday, December 12th

Newton's Method

Problems 1 & 2) Let x and y be related by:

$$y = x^2 + 3\sin(x)$$

1) Use graphical methods solve for x when

- y = +5
- y = +10

2) Find the solutions to problem #1 using Newton's method

Problems 3 & 4) Let x and y be related by

$$y = \cos(x)$$

$$y = \sin(0.6x)$$

3) Find all solutions in the range of (-5 < x < 5) using graphical methods. (Plot both functions on the same graph. The solution is when the two functions intersect.)

4) Find the solutions to problem #3 using Newton's method.

Newton's Method with a Temperature Sensor

Assume the temperature - resistance relationship of a sensor is:

$$R = 2000 \cdot \exp\left(\frac{4000}{T+273} - \frac{4000}{298}\right)\Omega$$

```
T = [-30:0.01: 30]';
R = 2000 * exp(4000 ./ (T + 273) - 4000/298);
plot(T,R)
```

5) Use Newton's method to find the temperature when

- R = 20,000 Ohms
- R = 5,000 Ohms

6) Determine how many iterations are required to get the answer within

- 1 degree C
- 0.001 degree C
- 0.000 001 degree C

Newton's Method and a Voltage Divider

Assume

$$V = \left(\frac{R}{R+2000}\right) \cdot 10V$$

7) Use Netwon's method to determine the temperature when

- V = 8.00V
- V = 6.00V