# Warm-Up Problems and Lecture Problems
# February 21, 2003

1. Suppose you have a line through the given point, with the given slope. Find the $y$-value of that line at the given $x$-value.

   (a) Point: $(1, 2)$, Slope: 3. If $x = 0$ then $y =$_____

   (b) Point: $(-1, 3)$, Slope: $-2$. If $x = 2$ then $y =$_____

   (c) Point: $(-2, 3)$, Slope: $\frac{3}{2}$. If $x = -1$ then $y =$_____

   (d) Point: $(0, -5)$, Slope: $-\frac{1}{6}$. If $x = \frac{2}{3}$ then $y =$_____

2. Now, come up with a general method to answer question 1 *without* first finding the equation of the line? In other words, find a formula to plug the point, the slope and the $x$-value into that will give you the $y$-value. Use your formula to answer the following questions:

   (a) Point: $(0, 2)$, Slope: $-\frac{1}{6}$. If $x = 1$ then $y =$_____

   (b) Point: $(1, -5)$, Slope: 0.7. If $x = 1.3$ then $y =$_____

   (c) Point: $(1.2, 3.5)$, Slope: $-.67$. If $x = 1.3$ then $y =$_____

   (d) Point: $(1.3, -3.2)$, Slope: 0.23. If $x = 1.42$ then $y =$_____

## Lecture Problems

3. Given the following differential equation:

$$\frac{dy}{dx} = -3y$$

   (a) Verify that $y = Ce^{-3x}$ is a solution.

   (b) Find the specific solution if $y(1) = 4$ (i.e., find the correct value for $C$).

4. Using Euler's method, with step size .2, construct a table of values for the initial value problem:

$$y' = x - y \qquad y(0) = 1$$

| $n$ | $x_n$ | $y_n$ |
|---|---|---|
| 0 | | |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |