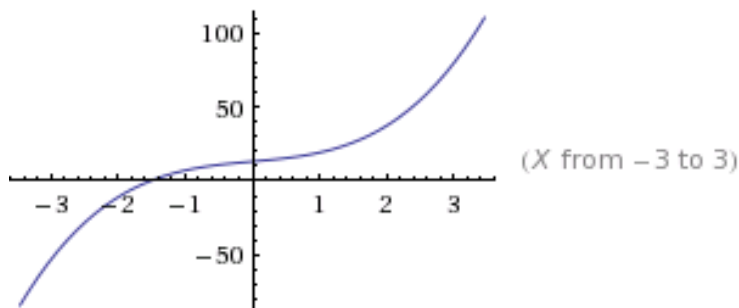


**Math Pretest – Answer key**

1. Use the Power Function Rule. Given  $F(x) = aX^n + bX^m$ ,  $F'(x) = (a*n)X^{(n-1)} + (b*m)X^{(m-1)}$ 
  - a.  $F'(x) = 6x^2 + 4$
  - b.  $F(x)$  is a curvilinear function and the slope of a curvilinear function is not constant. In geometry, the slope of a curvilinear function at a given point is measured by the slope of a line drawn tangent to the function at that point. The derivative of a function  $F'(x)$  is itself a function and it measures the slope (rate of change) of the original function at a given point.
  - c.  $F'(3) = 58$ ; The slope of the function  $F(x)$  evaluated at  $x = 3$  is 58. As you can see, via the plot of  $F(x)$  below, at  $x = 3$ , the slope of this curve is positive and very steep.



For help with Question 1, see the following videos, 35 minutes in length combined:

<http://www.khanacademy.org/video/calculus--derivatives-1--new-hd-version?playlist=Calculus>

<http://www.khanacademy.org/video/calculus--derivatives-2--new-hd-version?playlist=Calculus>

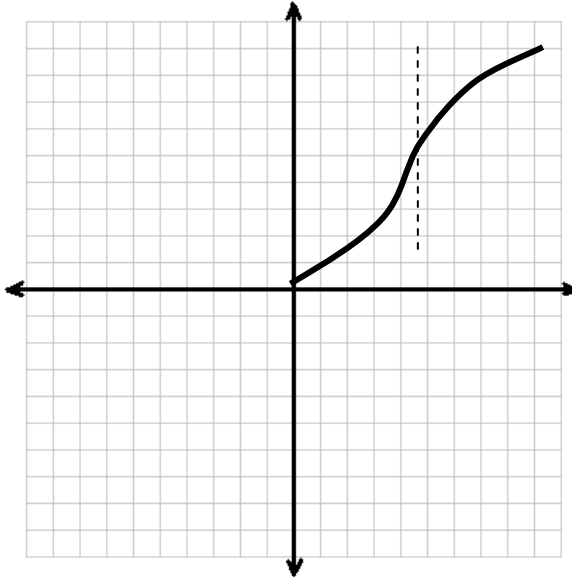
<http://www.khanacademy.org/video/calculus--derivatives-2-5--new-hd-version?playlist=Calculus>

For additional practice problems:

[http://www.khanacademy.org/exercise/derivatives\\_1](http://www.khanacademy.org/exercise/derivatives_1)

## 2. Plot

## a. A



The line starts at (0,0), the origin, and the slope of the function is always positive. The function increases rapidly at first, then continues to increase at a slower rate.

3. Using any method you choose (substitution, elimination, graphing) you should arrive at  $X = -1$ ,  $Y = 4$ .

## a. Khan videos

i. There are 3 substitution method videos, the first can be found at this link

1. <http://www.khanacademy.org/video/solving-systems-by-substitution-1?playlist=Algebra%20%20Worked%20Examples>

ii. There are 3 elimination method videos, the first of which can be found at this link

1. <http://www.khanacademy.org/video/solving-systems-by-elimination?playlist=Algebra%20%20Worked%20Examples>

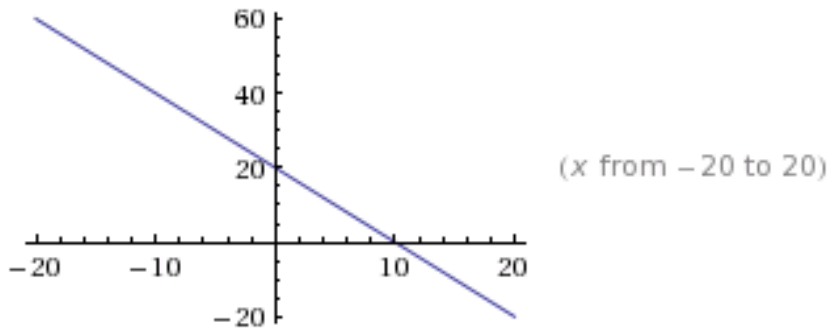
iii. Solving systems of equations by graphing is not the most time effective method, for this class you should use one of the other two methods.

iv. Practice problems

1. [http://www.khanacademy.org/exercise/systems\\_of\\_equations\\_with\\_substitution](http://www.khanacademy.org/exercise/systems_of_equations_with_substitution)
2. [http://www.khanacademy.org/exercise/systems\\_of\\_equations\\_with\\_elimination\\_0.5](http://www.khanacademy.org/exercise/systems_of_equations_with_elimination_0.5)

4. If  $Z = Y$ , we can set the two equations equal to each other;  $2R + 7 = 40 - R$ . From here we have one equation with one unknown, solve for  $R$ . You should get that  $R = 11$ .

5. Since the question asked you to put M on the vertical axis (y-axis) and N on the horizontal axis (x-axis), this equation is not in  $Y = mX + b$  format. What we need to do is re-arrange the equation for M in terms of N. Solving the equation for M should leave you with  $M = 20 - 2N$  (remember N has a 1 in front of it). Now we can graph:



- a.
- b. Once we've re-arranged the equation, it should be clear that the slope is -2. Even if it's not clear, you can still arrive at slope = -2 by picking any two points and calculating the "rise over run."
- c. We will be working extensively with equations and their graphs throughout this course, if your graphing skills are rusty, no sweat, Khan Academy has you covered:
1. <http://www.khanacademy.org/video/slope-of-a-line?playlist=Algebra%20I%20Worked%20Examples>
  2. <http://www.khanacademy.org/video/graphing-a-line-in-slope-intercept-form?playlist=Algebra%20I%20Worked%20Examples>
- d. Practice graphing
1. [http://www.khanacademy.org/exercise/graphing\\_linear\\_equations](http://www.khanacademy.org/exercise/graphing_linear_equations)