To be turned in for graded hw quiz on Friday February 20: (You can receive help on this.)

For each function below, do each of the parts a,b,c,d below. Do them in this order: 1a, 1b, 1c, 1d, 2a, 2b etc.

Then do #6 on the next page.

1. $f(x) = 7 - x + 3x^2$
2. $f(x) = -2x^2 - 5x$
3. $f(x) = -2x^2 + 3x - 1$
4. $f(x) = \dfrac{3}{x+1}$
5. $f(x) = \sqrt{1-x}$

a. Use the definition of derivative $f'(x) = \lim_{h \to 0} \dfrac{f(x+h) - f(x)}{h}$ to find $f'(x)$

b. Then use your result from part a to find $f'(-2), f'(0), f'(2)$

c. Then use your result from part b to find the equation of the tangent line at each of these points: $(-2, f(-2))$, $(0, f(0))$, $(2, f(2))$ (You are being asked to find the equation of 3 different tangent lines)

d. Then graph f and each of the tangent lines on your calculator in an appropriate window and copy the graph on your paper. (Show one graph which includes the original function and each of the three tangent lines) If the lines do not look tangent to the graph at the specified points then you know there is an algebra error which needs fixing.

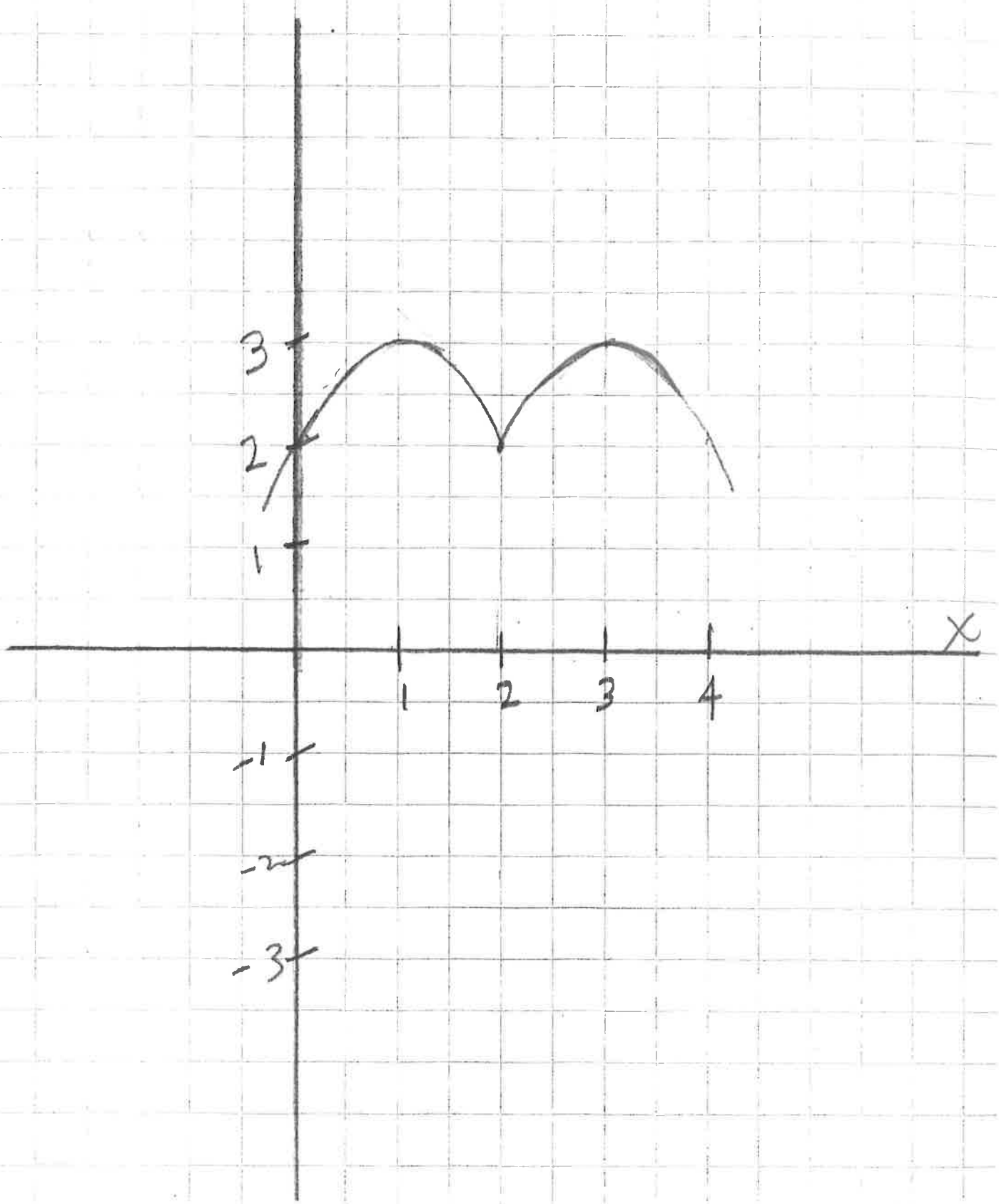
6. A) Draw the tangent line at each of the following points on the graph of y = f(x) on the next page (provided there is a tangent line at that point)

$(0, f(0))$, $\left(\frac{1}{2}, f\left(\frac{1}{2}\right)\right)$, $(1, f(1))$, $\left(\frac{3}{2}, f\left(\frac{3}{2}\right)\right)$, $(2, f(2))$, $\left(\frac{5}{2}, f\left(\frac{5}{2}\right)\right)$, $(3, f(3))$, $\left(\frac{7}{2}, f\left(\frac{7}{2}\right)\right)$, $(4, f(4))$

b) Estimate the slope of the tangent line at each point by counting squares to estimate rise and run. Put your estimates in the table below.

x	$f'(x)$ (that is, the slope of the tangent line at the point (x,f(x))
0	
1/2	
1	
3/2	
2	
5/2	
3	
7/2	
4	

c) Now go back to the graph on the next page and sketch the graph of the derivative function $f'(x)$ by plotting the points in the table above. Use a colored pencil for the derivative graph. (I am asking you to graph $f'(x)$ on the same set of axes as the graph of y = f(x) to help you see how the graphs of y = f(x) and y = $f'(x)$ are related.)


3
2
1
X
1
2
3
4
-1
-2
-3