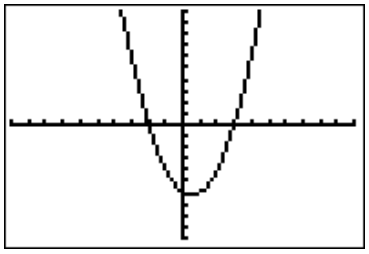
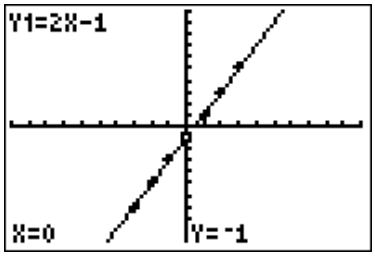
Chapter 1 Web Task Level 3 Sample Solution

a)

$y = x^2 - x - 6$

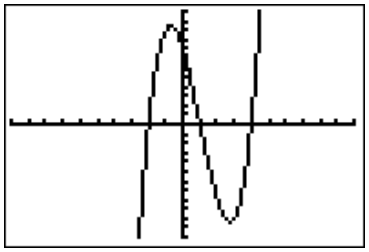


x	slope of tangent at x
0	−1
1	1
2	3
3	5
−1	−3
−2	−5
−3	−7

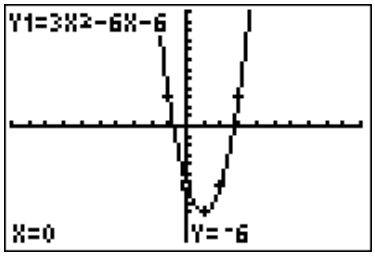


b)

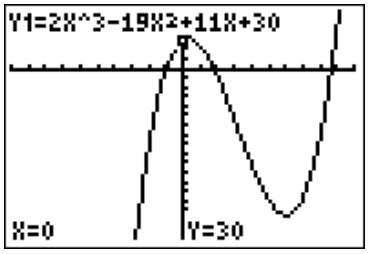
$y = x^3 - 3x^2 - 6x + 8$



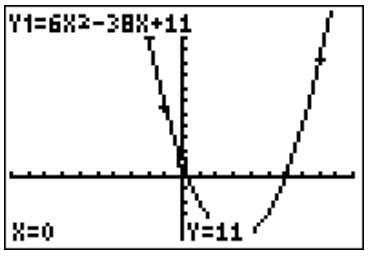
x	slope of tangent at x
0	−6
1	−9
2	−6
3	3
4	18
−1	3
−2	18



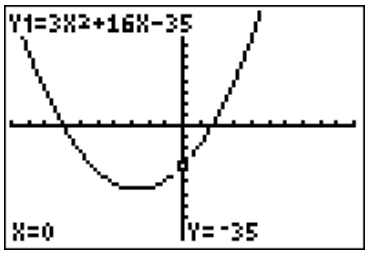
c) $y = 2x^3 - 19x^2 + 11x + 30$



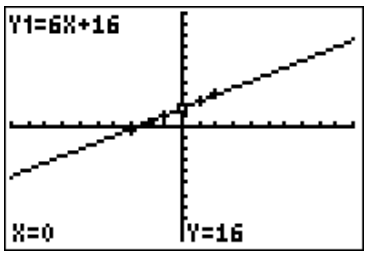
x	slope of tangent at x
0	11
2	−40
4	−45
6	−1
8	91
−1	55
−2	111



d) $y = 3x^2 + 16x - 35$



x	slope of tangent at x
0	16
1	22
2	28
−1	10
−2	4
−3	−2



Conjecture: The degree of the function formed by values of the tangent slopes is one less than the degree of the original function.

Conjecture: The equation for tangent slope function can be written by lowering the power of x on each term in the original equation and multiplying the numerical coefficient of the term by the original exponent. So, for example the term $3x^2$ becomes $6x$. My friend who is taking calculus tells me this is the derivative.

For the function $y = 3x + 5$ the equation for the tangent slope function would be $y = 3$. Yes, this works because the slope of the given linear function is 3 for all values of x.

Check: Try $y = -x^2 + 10x - 25$.
Conjecture the equation of the tangent slope function is $y = -2x + 10$.
I graphed $y = -x^2 + 10x - 25$ and found the slope at various points.

x	slope of tangent at x
0	10
1	8
2	6
4	2
5	0
6	−2
7	−4

I can see from this table of values that this is the line with y-intercept 10 and slope −2. My conjecture is correct.