

Math 151
Slope Formulas

For polynomial functions $f(x) = a + bx + cx^2 + dx^3$ of degree 3 or less, the formula for the slope of the tangent to the graph at the point where $x = p$ is given by

$$m = b + 2cp + 3dp^2.$$

For each polynomial,

- (a) Find the formula for the slope of the tangent to the graph at the point where $x = p$.
- (b) Find the equation of the tangent to the graph at the point where $x = p = -1$.
- (c) Find each critical point (both the x and y values).
- (d) Find $f(x)$ at $x = 0, 2, -2, 3, -3, 10, -10$. Also find the slope m at each of these values.
- (e) Use the information found above to sketch the graph.

1. $y = x^2 - 2x - 3$

2. $y = 4 + 4x - x^2$

3. $y = 2x^3 + 3x^2 - 12x + 7$

4. $y = x^3 - 12x$

5. $y = x^2(4x + 3) + 1$