

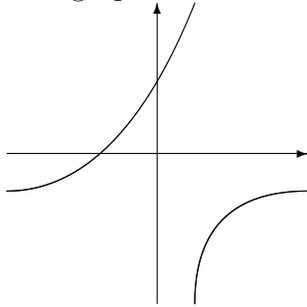
**Math 163A****Guide for Test 2**

Here are some sample questions from Sections 3.3–5, 4.1, and 4.2. Some topics that we covered are not represented by these questions, but are still fair game.

1. Let  $f(x) = -x^2 + 3$ .

- (a) Using the definition of the derivative as a limit, compute  $f'(x)$ .
- (b) Find the equation for the tangent line at  $x = 2$ .
- (c) Graph  $f(x)$  and the tangent line.

2. The graph of a function  $f$  is given below. On the same axes, sketch the graph of  $f'$ .



3. Compute the following derivatives:

(a)  $f(x) = 2 + x + \frac{3}{x} - \sqrt{x} - 5x^7 + x^{3/4}$   
 $\Rightarrow f'(x) =$

(b)  $y = \frac{x^3 + x}{x} \Rightarrow \frac{dy}{dx} =$

(c)  $D_x [(x^9 + x^8 + x^5 + 3)(1 + 2x^2 + 9x^3 - 4x^4)] =$

(d) If  $f(x) = \frac{u(x)v(x)}{w(x)}$ , then in terms of  $u(x)$ ,  $v(x)$ ,  $w(x)$ ,  $u'(x)$ ,  $v'(x)$ , and  $w'(x)$ , we have  $f'(x) =$