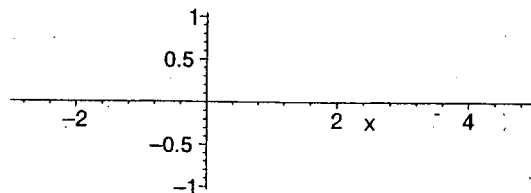
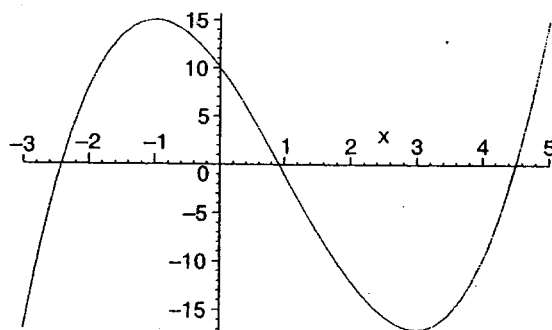


Math 211: Exam #1  
February 17, 2003

Name: \_\_\_\_\_  
TA: \_\_\_\_\_

1. Determine  $\lim_{x \rightarrow 1} \frac{x^2 + 4x - 5}{x^2 + x - 2}$ .

2. On the number line provided, indicate (with + or -) where the *derivative* of the given function is positive or negative, respectively. Also, circle the  $x$ -value of any critical points.



3. Using the *definition* of the derivative, find the derivative  $f'(x)$  of the function

$$f(x) = x^2 + 3.$$

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

(a) Write  $f$  as the composition of two simpler functions  $f = g \circ h$ .

(b) Using the chain rule, find the derivative of  $f$  with respect to  $x$ ?

5. Take the derivatives of the following functions.

(a)  $g(x) = \frac{x^3+2}{x-1}$

(b)  $G(x) = (x^2 + 5)^3(x^2 - 10)$

6. A certain company is selling T-shirts. The company's profit, as a function of the number of T-shirts the company sells, is given by the function

$$p(q) = q^3 + 4q - 5.$$

The number of T-shirts the company will sell in week  $t$  is given by

$$q(t) = t^2 + t + 2.$$

Determine the instantaneous rate of change in profit with respect to time (in weeks) after 2 weeks.

7. Let  $f(x) = x^3 + 3x^2 - 24x + 6$ . Find the critical points for  $f(x)$ .