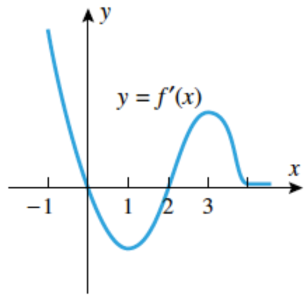
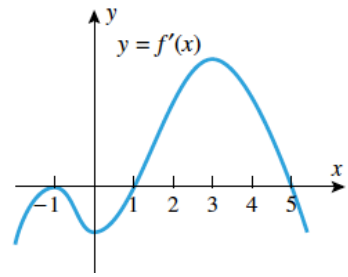
BC CALCULUS PRACTICE 5.2-5.3 **Name:** ____________________________ **Period** _______

1. Locate the critical values and identify which critical values correspond to stationary points.

a. $f(x) = x^3 + 3x^2 - 9x + 1$	b. $f(x) = x^4 - 6x^2 - 3$
c. $f(x) = \frac{x}{x^2+2}$	d. $f(x) = x^{2/3}$
e. $f(x) = \sqrt[3]{x+2}$	f. $f(x) = \cos 3x$

2. Use the graph of f' below to estimate all values of x at which f has (a) relative minima, (b) relative maxima, and (c) inflection points.





3. Use the given derivative to find all critical numbers of f, and at each critical number determine whether a relative maximum, relative minimum, or neither occurs.

a.

$$f'(x) = x^3(x^2 - 5)$$

b.

$$f'(x) = \ln\left(\frac{2}{1+x^2}\right)$$

4. Use any method to find the relative extrema of f.

$$f(x) = 2x^2 - x^4$$

$$f(x) = 2x + x^{2/3}$$

$$f(x) = |x^2 - 4|$$

5. Find k such that f has a relative extremum at the point where $x = 3$.

$$f(x) = x^2 + \frac{k}{x}$$

6. Analyze the following functions with laser-like precision. State all intervals of increasing, decreasing, concavity. Find all extrema and inflection points. If you're feeling saucy you can find the x/y intercepts and all asymptotes.

$f(x) = x^3 - 3x + 1$

$f(x) = x^4 + 2x^3 - 1$

$f(x) = 3x^5 - 5x^3$

$f(x) = x(x-1)^3$

7. Analyze the following functions with laser-like precision. State all intervals of increasing, decreasing, concavity. Find all extrema and inflection points. If you're feeling saucy you can find the x/y intercepts and all asymptotes.

$$f(x) = \frac{2x}{x-3}$$

$$f(x) = \frac{x^2}{x^2-1}$$

$$f(x) = \frac{x-1}{x^2-4}$$