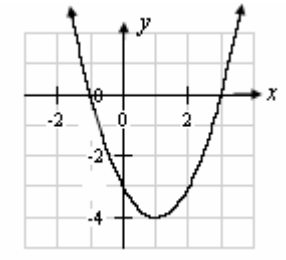
Name: _____

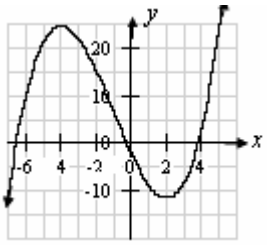
Curve Sketching

Exercise 1: By performing a sign analysis on $f'(x)$, determine the open interval(s) in which each of the following functions is increasing or decreasing. Check your answers by examining the graph provided.

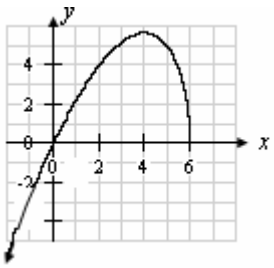
1) $f(x) = x^2 - 2x - 3$



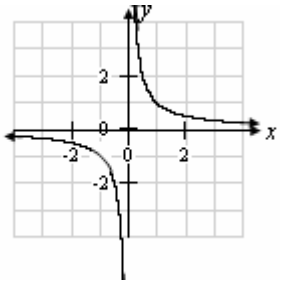
2) $f(x) = \frac{1}{3}x^3 + x^2 - 8x - 2$



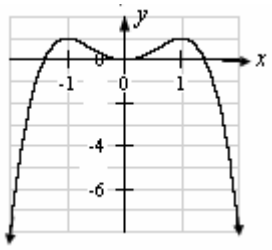
3) $f(x) = x\sqrt{6-x}$



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



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



Exercise 2: Find the intervals in which the function is increasing or decreasing. Find the coordinates of any relative extrema. Use the first derivative test. Verify with a graphing calculator.

1) $f(x)=14-5x-x^2$

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

3) $f(x)=x^4-8x$

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

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

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

7) $f(x)=(x-1)\sqrt{x+2}$

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

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

10) $f(x)=3\sqrt[3]{x}-x$

11) $f(x)=(x^2-9)^{2/3}$

Exercise 3: Let $f(x)=x^3-x$. Find:

1) Critical numbers of *f*.
2) Intervals on which *f* is increasing or decreasing.
3) Find any extrema

Exercise 4: Let $f(x)=\frac{2x-1}{x-3}$. Find:

1) Critical numbers of *f*.
2) Find the intervals on which *f* is increasing or decreasing.
3) Find any extrema

Exercise 5: Let $f(x)=\sqrt[3]{x-2}$. Find:

1) Critical numbers of *f*.
2) Intervals on which *f* is increasing or decreasing
3) Find any extrema