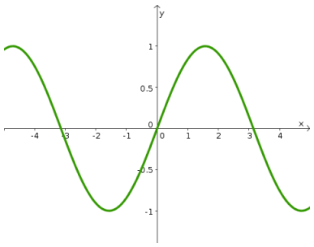
Max Min, Concavity, and Second Derivative Assignment – (Hand in)



All answers *can and should be checked by* **graphing the function on your calculator or online graphing utility.**

1. Describe the difference between ***local*** and ***absolute*** Max and Min Values.

2. Find the <u>absolute</u> max and min values for the following functions using the **closed interval method:**

   a) $2x \ - \ 3x^{2/3}$ [-1,3]

   b) $2x^5 - \ 5x^2 \quad [\frac{1}{2}, 2]$

   Graph both functions to check you answer. Sketch the graph below.

3. Find the critical values of the following functions:

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

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

   c) $g(x) = \sqrt{x}(x-3)$

Use written statement to answer the following questions:

4. What does $f'(x)$ tell you about f(x) ?
5. What does $f''(x)$ tell you about f(x)?
6. If $f''(x) = 0$, what does this mean?
7. If $f''(x) > 0$, what does this mean?
8. If $f''(x) < 0$, what does this mean?

9. Find the **inflection points** for $f(x) = (x-1)^2(x-3)$ and determine what intervals *f(x)* is concave up and concave down (**sketch a graph** to check your answer)

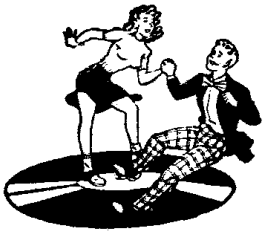
10. Use the *second derivative test* to find the **local** max and mins for the following functions:

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

    b) $f(x) = x^4 + 8x^3 + 50$

Bonus:

11. The **groovyness** of the all fun parties is dependent on the **tempo of the music played** *according the scientifically formulated function*:



$Groovyness(x) = 2x^3 + 15x^2 - 36x$ [0.5,3]

Where: ***x*** - is music tempo in(beats per second)
G(x) - is groovyness as a function of music tempo -*x*

Determine the music tempo level between 0.5 and 3 (beats per second) that will create the maximum groovyness at a party.

Hint: use the closed interval method

Draw a graph of G(x) below

Bonus:

12. Create your own max/min question (like #11) and show a complete solution with a graph.