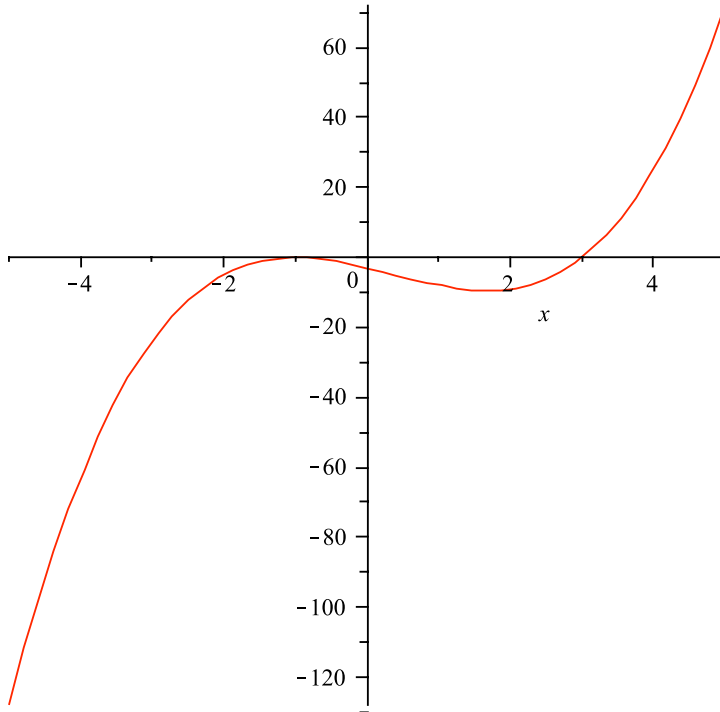


MCS 119

Derivative Review II

1. The thickness of a glacier (in meters) is given by $f(t) = 700 - 3t^2$ where t is measured in years since 1995. Find $f(5)$ and $f'(5)$. Using units, explain what each means in terms of the glacier.
2. Find the equation of the tangent line to $f(x) = x^3$ at the point where $x = 2$.
3. If $f(t) = 2t^3 - 4t^2 + 3t - 1$ find $f'(t)$ and $f''(t)$.
4. On what intervals is the graph of $y = x^4 - 4x^3$ both decreasing and concave up?

5. The figure below is of the **derivative** $f'(x)$. Use it to answer the following questions.



- (a) On what interval(s) is $f(x)$ increasing?
- (b) At what points (if any) does $f(x)$ have a local maximum?
- (c) At what points (if any) does $f(x)$ have a local minimum?
- (d) On what interval(s) is $f''(x) > 0$?
- (e) On what interval(s) is $f(x)$ concave up?

6. Find the critical points of $f(x) = 24x^2 - x^3$ and classify each of them as a local maximum, minimum, or neither.

7. The sum of 2 positive numbers is 24. Find the values that maximize the first times the square of the second.