Math 140 Worksheet 4

Week 4: Basic Derivative Rules

Instructions. Write clear solutions on your own paper. Show enough work to justify your answers. Upload a single PDF of your work to Canvas.

1. Use the limit definition of the derivative to compute $f'(a)$ if

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

2. Differentiate the following functions.

   (a) $7x^4 - 3x^2 + 5$

   (b) $\sqrt{x} + 4x^3$

3. Let $h(x) = 5x^2 - 4x$.

   (a) Find the equation of the tangent line to $y = h(x)$ at $x = 1$.

   (b) Find all x such that the slope of the tangent line is 6.

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

   (a) Compute $f'(x)$.

   (b) Find all points where the tangent line is horizontal.