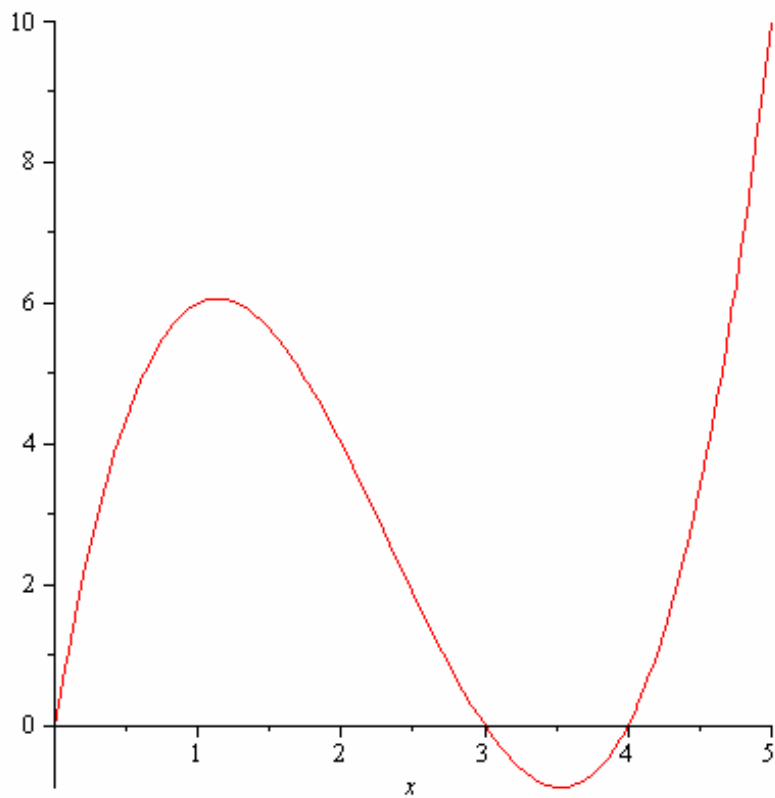


Mth 445 In Class Exercise on Derivatives

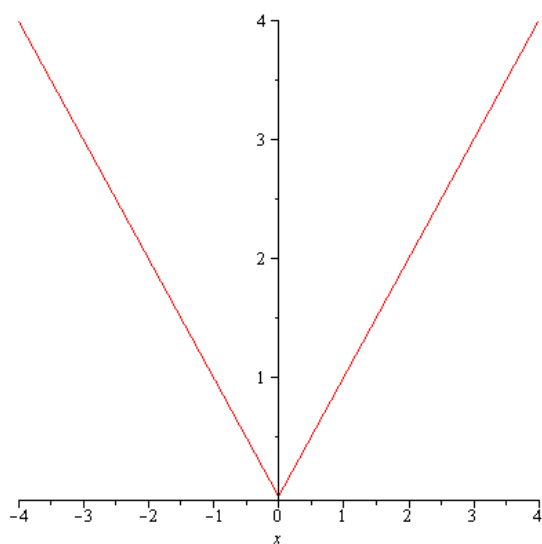
Exercise 1: .

Sketch approximately what the derivative of this function would look like

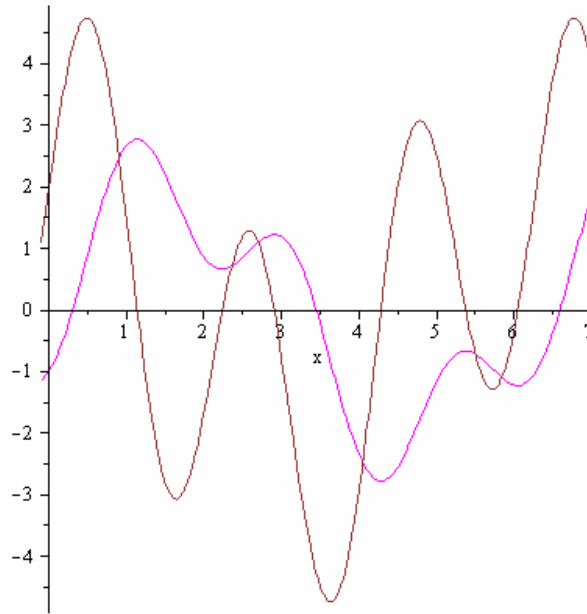


Exercise 2: .

Sketch approximately what the derivative of this function would look like



Exercise 3: For the following plot of a function and its derivative, which one is the derivative and which is the original function.



Exercise 4: Let $f(x) = x \sin\left(\frac{1}{x}\right)$ if $x > 0$ and 0 if $x \leq 0$.

Plot $f(x)$. Use the graph to make a conjecture whether $D(f)(0)$ exists, Check your answer by computing $D(f)(x)$.

Conjecture:

Exercise 5: A variation on the function in the exercise above: Has anything changed?

Let $f(x) = x^2 \sin\left(\frac{1}{x^2}\right)$ for $x > 0$ and 0 for $x \leq 0$.

Plot $f(x)$. Use the graph to make a conjecture to whether $D(f)(0)$ exists. Then compute $D(f)(x)$.

Conjecture:

Exercise 6:

Let $f(x) = |\cos(x)|$. Determine values for x where $f(x)$ is **not** differentiable.

Answer: