

MATH 145 Calculus for Engineering and Science I

Recitation 6

November 24th, 2025

1. Find the maximum and minimum values on the indicated intervals, by finding the points in the interval where the derivative is 0, and comparing the values at these points with the values at the end points.

1. $f(x) = x^3 - x^2 - 8x + 1$ on $[-2, 2]$

2. $f(x) = \frac{1}{x^5+x+1}$ on $[-1/2, 1]$.

2. Find the following limits:

1. $\lim_{x \rightarrow 0} \frac{x}{\tan x}$,

2. $\lim_{x \rightarrow 0} \frac{\cos^2 x - 1}{x^2}$.

3. Find $f'(0)$ if $f(x) = g(x)/x$ for $x \neq 0$ and $f(x) = 0$ for $x = 0$, and $g(0) = g'(0) = 0, g''(0) = 17$.

4. Let $f(x) = x^4 \sin^2(1/x)$ for $x \neq 0$, and let $f(0) = 0$. Prove that

1. 0 is a local minimum point for f ,

2. $f'(0) = f''(0) = 0$.