

HOMEWORK 5 - MATH 151

DUE DATE: Monday, March 10

INSTRUCTOR: George Voutsadakis

Read each problem **very carefully** before starting to solve it. Two out of the eight problems will be chosen at random and graded. Each problem graded will offer you 5 bonus (extra) points towards your class average. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the limit as x approaches -1 of the average rate of change of the function $f(x) = 2x^2 + 3x$ from -1 to x .
2. Find the limit as x approaches 1 of the average rate of change of $f(x) = \sqrt{x}$ from 1 to x .
3. Find the limit $\lim_{x \rightarrow 3^+} \frac{x^2-9}{x-3}$.
4. Find the limit $\lim_{x \rightarrow -4^-} \frac{x^2+x-12}{x^2+4x}$.
5. Let $f(x) = \frac{x^2-8x}{x^2+8x}$. Determine whether $f(x)$ is continuous at $c = 0$. **Justify** your answer.
6. Let $f(x) = \begin{cases} \frac{x^2-2x}{x-2}, & \text{if } x < 2 \\ 2, & \text{if } x = 2 \\ \frac{x-4}{x-1}, & \text{if } x > 2 \end{cases}$ Determine whether $f(x)$ is continuous at $c = 2$. **Justify** your answer.
7. Find the limit $\lim_{x \rightarrow -\infty} \frac{5x^3-1}{x^3+1}$. What does your result mean in terms of asymptotes?
8. Find the limit $\lim_{x \rightarrow 5^+} \frac{2-x}{5-x}$. What does your result mean in terms of asymptotes?