

HOMEWORK 4 - MATH 151

DUE DATE: Monday, March 3

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. Graph the function $f(x) = x^3 + 2$. Use the graph to find the limit $\lim_{x \rightarrow -2} f(x)$ if it exists.
2. Graph the function $f(x) = \log_5(x + 4)$. Use the graph to find the limit $\lim_{x \rightarrow -\frac{19}{5}} f(x)$ if the limit exists.
3. Graph the function $f(x) = \begin{cases} x^2, & \text{if } x \leq 2 \\ 2x - 1, & \text{if } x > 2 \end{cases}$. Then find the limit $\lim_{x \rightarrow 2} f(x)$ if it exists.
4. Graph the function $f(x) = \begin{cases} e^x - 1, & \text{if } x \leq 0 \\ x^2, & \text{if } x > 0 \end{cases}$. Then find the limit $\lim_{x \rightarrow 0} f(x)$ if it exists.
5. Find the limits: (**You must show all the steps.**)
 - (a) $\lim_{x \rightarrow 3} (-7)$
 - (b) $\lim_{x \rightarrow 5} x$
 - (c) $\lim_{x \rightarrow -2} (3 - 5x)$
6. Find the limits: (**You must show all the steps.**)
 - (a) $\lim_{x \rightarrow 1} \frac{x^2 - 4}{x^2 + 4}$
 - (b) $\lim_{x \rightarrow 1} \sqrt{12x + 4}$
7. Find the limits: (**You must show all the steps.**)
 - (a) $\lim_{x \rightarrow -2} \frac{(x+2)^2}{x^2 - 4}$
 - (b) $\lim_{x \rightarrow -1} \frac{x^3 + x^2 + 3x + 3}{x^4 + x^3 + 2x + 2}$
 - (c) $\lim_{x \rightarrow 3} \frac{x^3 - 3x^2 + 4x - 12}{x^4 - 3x^3 + x - 3}$
8. Find the limit as x approaches c of the average rate of change of each function:
 - (a) $c = -2; f(x) = 3 - 7x$
 - (b) $c = 1; f(x) = \frac{1}{x^2}$