

Math 251 -- Test # 1 (Sec. 1.1-2.3)

Part A (30 minutes)

Due by 4:00 p.m. (Submitted by 4:15 p.m.)

2/13/23

Directions:

- 1) Must upload to Gradescope as a **single** PDF by the time it is due (**Be sure to allow enough time!!!** Remember you have a 15-minute grace period before any penalty, but after that there is a steep penalty!)
 - 2) Must **match** each problem to the page it is on.
 - 3) Make sure to follow all directions carefully by reading all directions carefully!
 - 4) Write clearly with sharp pencil or dark ink. Make sure all work is clear and legible!
 - 5) Make sure all pictures are clear and easy to read.
 - 6) You may use your study guide, but **NOTHING ELSE!**
 - 7) If you have any questions, **ask me and only me.**
 - 8) You may use a scientific calculator only--**Not** a graphing calculator.
 - 9) **You MUST show ALL your work for full credit! Box your final answer!**
 - 10) **Simplify** all answers and leave all answers in **Exact Form** (i.e. no decimals) unless otherwise noted.
 - 11) Good luck!
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1. Consider the functions $f(x) = \frac{x^2 - 25}{x + 5}$ and $g(x) = x - 5$. For the following questions, give a detailed clear explanation in words.
 - a) Does $f(x)$ equal $g(x)$ for every value of x . Explain.
 - b) Does $\lim_{x \rightarrow -5} f(x)$ does exist? If it exists, what is its value? Explain.
2. Given $f(x) = \frac{1-x}{2-x}$ and $g(x) = \frac{4}{x}$ Find $(f \circ g)(x)$ and its domain. Write the domain in interval notation and set notation.
3. Find the limit. If the limit is $+\infty$ or $-\infty$ or does not exist, then state this and give an explanation why in words.
 - a) $\lim_{x \rightarrow 0^+} \left(\frac{\pi}{2} \ln(\tan x) \right)$
 - b) $\lim_{x \rightarrow 1} \left(\frac{1}{x^2 - 1} - \frac{2}{x^4 - 1} \right)$

4. Sketch a possible graph of $f(x)$ that satisfies all the following conditions.

$$\lim_{x \rightarrow -5} f(x) = -\infty,$$

$$\lim_{x \rightarrow 0} f(x) = 0,$$

$$\lim_{x \rightarrow -1^-} f(x) = +\infty,$$

$$\lim_{x \rightarrow -1^+} f(x) = -\infty$$

$$\lim_{x \rightarrow 2^-} f(x) = 0,$$

$$\lim_{x \rightarrow 2^+} f(x) = -4,$$

$$f(0) = f(-3) = 0,$$

$$f(2) = -2$$

Point Breakdown for Part A

#1 10 pts (5/5)

#2 8 pts

#3 20 pts (10/10)

#4 12 pts

Total possible points for Part A 50 pts