

MATH 200
CALCULUS I

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TEST 1



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Name: _____

Score: _____

Directions. Please solve the following questions in the space provided. Unless noted otherwise, you must show your work to receive full credit. This is a closed-book, closed-notes test. Calculators, computers, etc., are not to be used.

6. (15 points) Answer the questions about the function $f(x)$ graphed below.

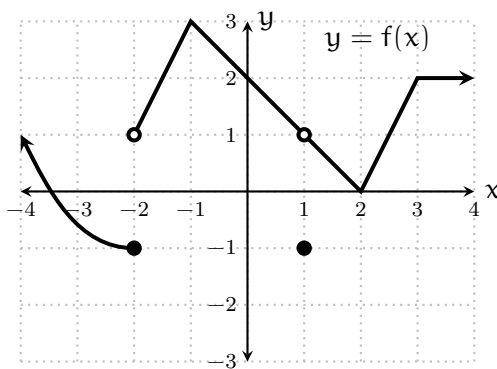
(a) $\lim_{x \rightarrow -2^+} f(x) =$

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

(c) $\lim_{x \rightarrow 1} \frac{5f(x)}{1+f(x)} =$

(d) $f \circ f(-1) =$

(e) At which values c is $f(x)$ **not** continuous at $x = c$?



1. (25 points) Warmup: short answer.

(a) $\sec(5\pi/4) =$

(b) Describe the domain of $f(x) = \frac{x}{1 - \tan(x)}$.

(d) If $f(x) = \frac{\sin(x)}{x}$ and $g(x) = x + \sqrt{x}$,
then $f \circ g(x) =$

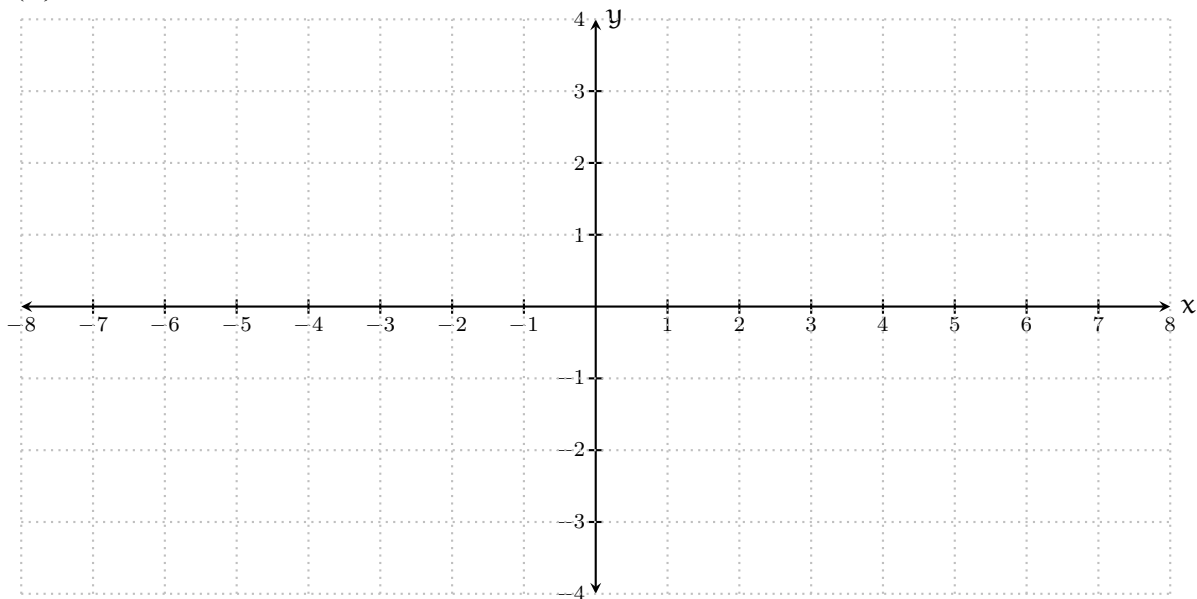
(d) $\lim_{x \rightarrow 2} \left(\frac{1}{4} + \frac{8}{x^2} \right)^{\frac{3}{2}} =$

(e) $\lim_{x \rightarrow \frac{\pi}{2}} \cot(x) =$

2. (15 points) Find all solutions of the equation $\cos^2(x) - \cos(x)\sin(x) = 0$, where $0 \leq x \leq 2\pi$.

3. (15 points) Sketch the graph of any function that meets the following criteria.

- (a) $f(1) = 2$
- (b) $\lim_{x \rightarrow \infty} f(x) = 0$ and $\lim_{x \rightarrow -\infty} f(x) = 0$
- (c) $\lim_{x \rightarrow 0^+} f(x) = 3$ and $\lim_{x \rightarrow 0^-} f(x) = 1$
- (d) Lines $x = 2$ and $x = 5$ are vertical asymptotes.
- (e) $\lim_{x \rightarrow -4} f(x) = 2$
- (f) $f(x)$ is not continuous at $x = -4$



4. (15 points) Evaluate the following limits.

(a) $\lim_{x \rightarrow 0} \frac{\sin(7x)}{5x} =$

(b) $\lim_{x \rightarrow 3} \frac{\sqrt{x} - \sqrt{3}}{x - 3} =$

(c) $\lim_{h \rightarrow 0} \frac{\frac{1}{6+h} - \frac{1}{6}}{h} =$

5. (15 points) This question concerns the function

$$f(x) = \frac{x^2 - 1}{7x^3 - 7x^2}.$$

(a) State the intervals on which $f(x)$ is continuous.

(b) Find the horizontal asymptotes (if any).

(c) Find the vertical asymptotes (if any).