VCU

MATH 200

CALCULUS I

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TEST 1

June 23, 2014

Name: _____

Score: _____

Directions. Answer the questions in the space provided. Unless noted otherwise, you must show and explain your work to receive full credit. Put your final answer in a box when appropriate.

This is a closed-book, closed-notes test. Calculators, computers, etc., are not used.

1. (25 points) Warmup: quick answer.

(a) $25^{-0.5} =$

(b) State the domain of $f(x) = \sqrt{x+3} + \sqrt{7-x} + \frac{1}{x}$.

(c) If $f(x) = \sin(x)\cos(x)$ and $g(x) = \sqrt{x} + x$, then:

$f \circ g(x) =$

$g \circ f(x) =$

(d) $\cos \frac{7\pi}{6} =$

(e) $\lim_{x \to \pi^+} \frac{\cos(x)}{1+\cos(x)} =$

2. (10 points) Consider the equation $x\cos(x) = \cos(x)$.
Find all solutions x of this equation for which $0 \leqslant x \leqslant 2\pi$.

3. (15 points) Evaluate the following limits.

(a) $\lim_{x \to 0} \dfrac{\sin(1 - \cos x)}{1 - \cos x} =$

(b) $\lim_{x \to 2} \dfrac{x^2 - 4}{x - 2} =$

(c) $\lim_{x \to 1} \dfrac{\dfrac{1}{x} - 1}{x - 1} =$

4. (15 points) Sketch the graph of any function that meets all of the following criteria.

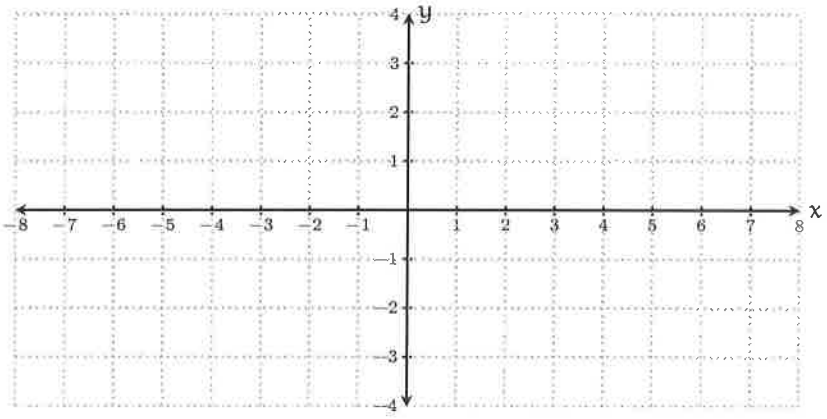
(a) The domain of $f(x)$ is all real numbers except $x = 4$

(b) $f(x)$ is continuous at all real numbers except $x = 1$ and $x = 4$

(c) $\lim_{x\to\infty} f(x) = 3$ and $\lim_{x\to 1^+} f(x) = 2$

(d) The line $x = 4$ is a vertical asymptote

(e) $\lim_{x\to -3} f(x) = 1$



5. (20 points) Evaluate the following limits.

(a) $\lim_{x \to 8} \dfrac{x-2}{\sqrt{x}(\sqrt{x}-\sqrt{2})} =$

(b) $\lim_{x \to 2} \dfrac{x-2}{\sqrt{x}(\sqrt{x}-\sqrt{2})} =$

(c) $\lim_{x \to 0^+} \dfrac{x-2}{\sqrt{x}(\sqrt{x}-\sqrt{2})} =$

(d) $\lim_{x \to \infty} \dfrac{x-2}{\sqrt{x}(\sqrt{x}-\sqrt{2})} =$

6. (15 points) Two functions $f(x)$ and $g(x)$ are graphed below. Answer the following questions.

(a) $\lim_{x \to 3} f(x) =$

(b) $f(3) =$

(c) $f\left(\lim_{x \to 1} g(x)\right) =$

(d) $\lim_{x \to 1} f(g(x)) =$

(e) $\lim_{x \to 3} f(x)g(x) =$