Name: _____

Quiz 4

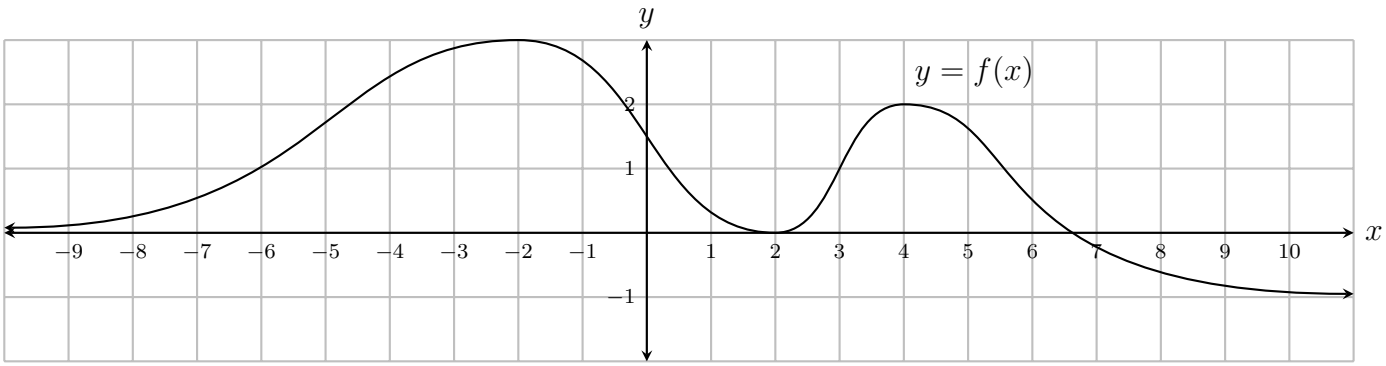
MATH 200, Section 9

February 19, 2021

Directions: Closed book, closed notes, no calculators. Each problem is 10 points, for a total of 20 points.

By submitting this quiz you affirm that you agree with this statement: *On my honor, I have neither given nor received unauthorized aid on this assignment, and I pledge that I am in compliance with the VCU Honor System.*

1. Answer the following questions involving the function $f(x)$ graphed below.



(a) $\lim_{x\to-\infty} f(x) = \boxed{0}$

(b) $\lim_{x\to-\infty} f\left(\frac{1}{x}+3\right) = f\left(\lim_{x\to-\infty}\left(\frac{1}{x}+3\right)\right)$
$= f(0+3) = f(3) = \boxed{1}$

(c) $\lim_{x\to 2} \ln\big(f(x)\big) = \boxed{-\infty}$
(Because as x approaches 2, $f(x)$ approaches 0 from the right, so $\ln\big(f(x)\big)$ approaches $-\infty$.)

(d) $\lim_{x\to 2} \dfrac{1}{f(x)} = \boxed{\infty}$
(Because as x approaches 2, $f(x)$ is positive, approaching 0.)

(e) $\lim_{x\to 4} \dfrac{x}{1-f(x)} = \dfrac{4}{1-2} = \boxed{-4}$

2. Sketch the graph of **one** function f, continuous on $(-\infty, 2)\cup(2,\infty)$, meeting **all** of these criteria:

(a) The line $y = 2$ is a horizontal asymptote

(b) $\lim_{x\to\infty} f(x) = 0$

(c) $\lim_{x\to 0} f(x) = -\infty$

(d) $\lim_{x\to 2^-} f(x) = \infty$

(e) $\lim_{x\to 2^+} f(x) = -\infty$