Name _____ Rec. Instr._____
Signature _____ Rec. Time_____

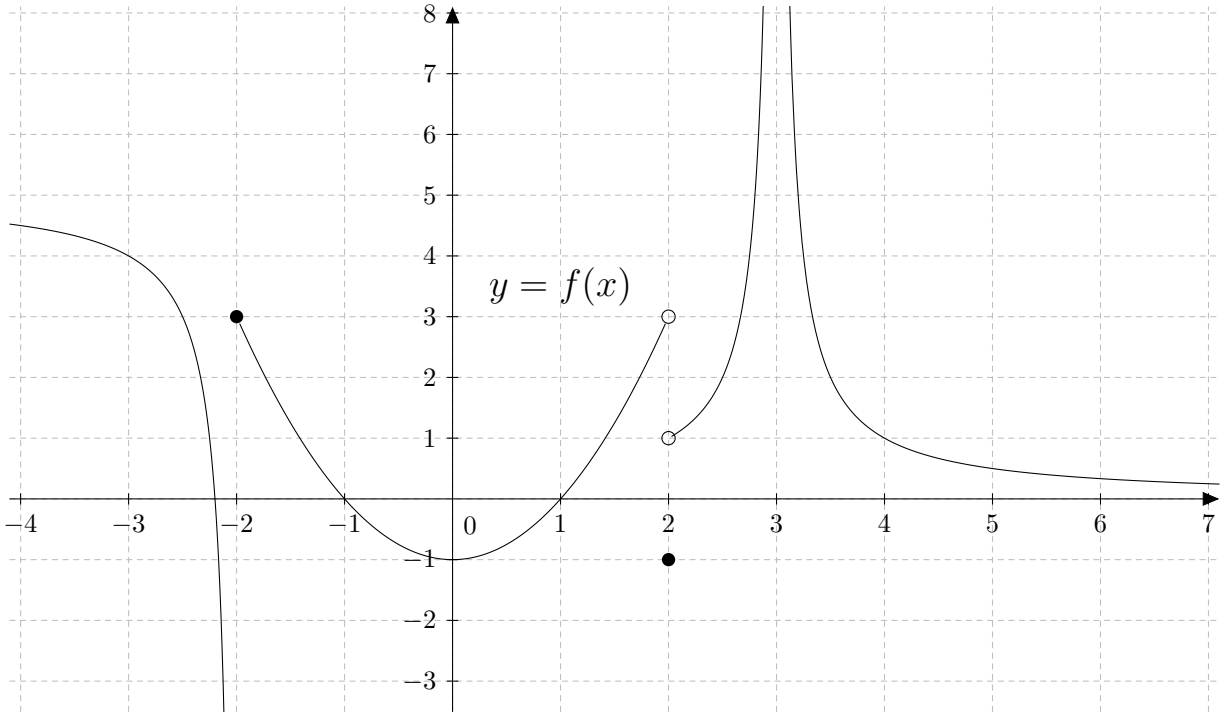
Math 220
Exam 1
February 2, 2012

No books, calculators, or notes are allowed. Please make sure that your cell phone is turned off. You will have 75 minutes to complete the exam.

Problem	Points	Points Possible	Problem	Points	Points Possible
1		7	5		8
2		10	6		8
3		24	7		8
4		35	Total Score		100

1. (7 points) Is $q(x) = \begin{cases} 4 & \text{if } x = 2 \\ \frac{x^2-4}{x-2} & \text{if } x \neq 2 \end{cases}$ continuous at $x = 2$? (Explain your answer.)

2. (10 points) Find the horizontal asymptote(s) for $y(x) = \dfrac{\sqrt{4x^2+1}}{3x+7}$. (Show your work using limits.)



3. (3 points each) Consider the graph of $y = f(x)$ above. State the value of each of the below quantities. If the quantity does not exist, write "does not exist".

A. $\lim_{x \to 0} f(x)$

B. $\lim_{x \to -2^-} f(x)$

C. $\lim_{x \to -2^+} f(x)$

D. $\lim_{x \to 3} f(x)$

E. $\lim_{x \to 2^-} f(x)$

F. $\lim_{x \to 2^+} f(x)$

G. $\lim_{x \to 2} f(x)$

H. $f(2)$

4. (7 points each) Evaluate the following limits. (Show your work.)

A. $\lim_{x \to \pi} \sin(x)$

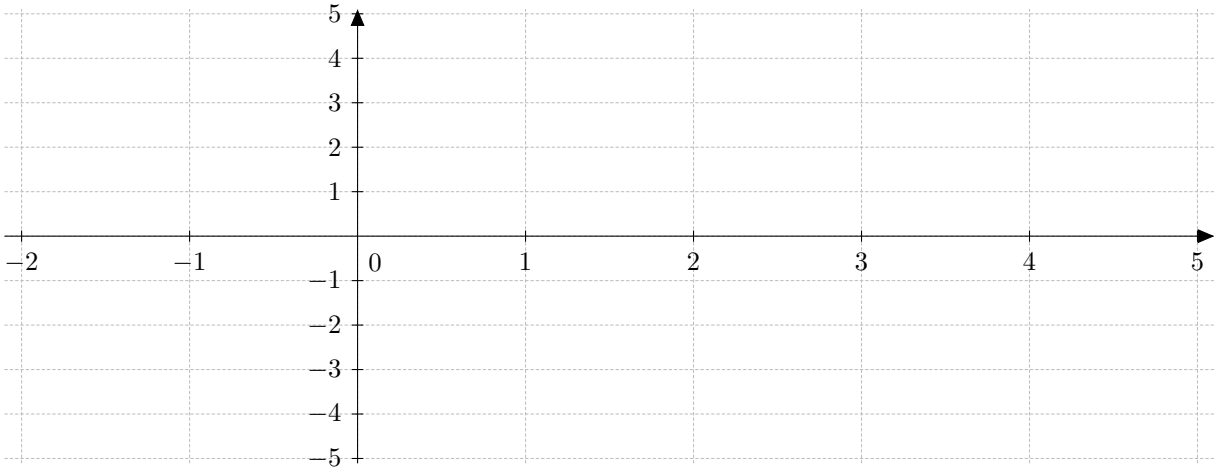
B. $\lim_{x \to 3} \dfrac{x - 3}{x^2 - 5x + 6}$

C. $\lim_{t \to 3} \dfrac{\sqrt{t + 6} - 3}{3 - t}$

D. $\lim_{x \to 2} (x - 2)^2 \cos\left(\dfrac{\pi}{x - 2}\right)$

E. $\lim_{x \to \infty} \dfrac{2 - e^x}{3e^x + 5}$

5. (8 points) Sketch the graph of a function $v(x)$ that satisfies $\lim_{x\to -1} v(x) = \infty$, $\lim_{x\to 2^-} v(x) = 1$, $\lim_{x\to 2^+} v(x) = 3$, and $\lim_{x\to 3} v(x) = -\infty$.



6. (8 points) Use the Intermediate Value Theorem to show that there is a root of $x^5 + x - 1 = 0$ in the interval $(0, 1)$.

7. (4 points each) Given that $\lim_{x\to 1} h(x) = 2$ and $\lim_{x\to 1} w(x) = 3$, find the following limits.

A. $\lim_{x\to 1} (2h(x) + w(x))$

B. $\lim_{x\to 1} \dfrac{h(x) + 2}{w(x)}$