

Name: \_\_\_\_\_

Sept. 14, 2012

I'm in the Thurs11 Thurs12 Thurs1 or Fri10 recitation (Circle one)

MATH 200 – TEST 1 ♠

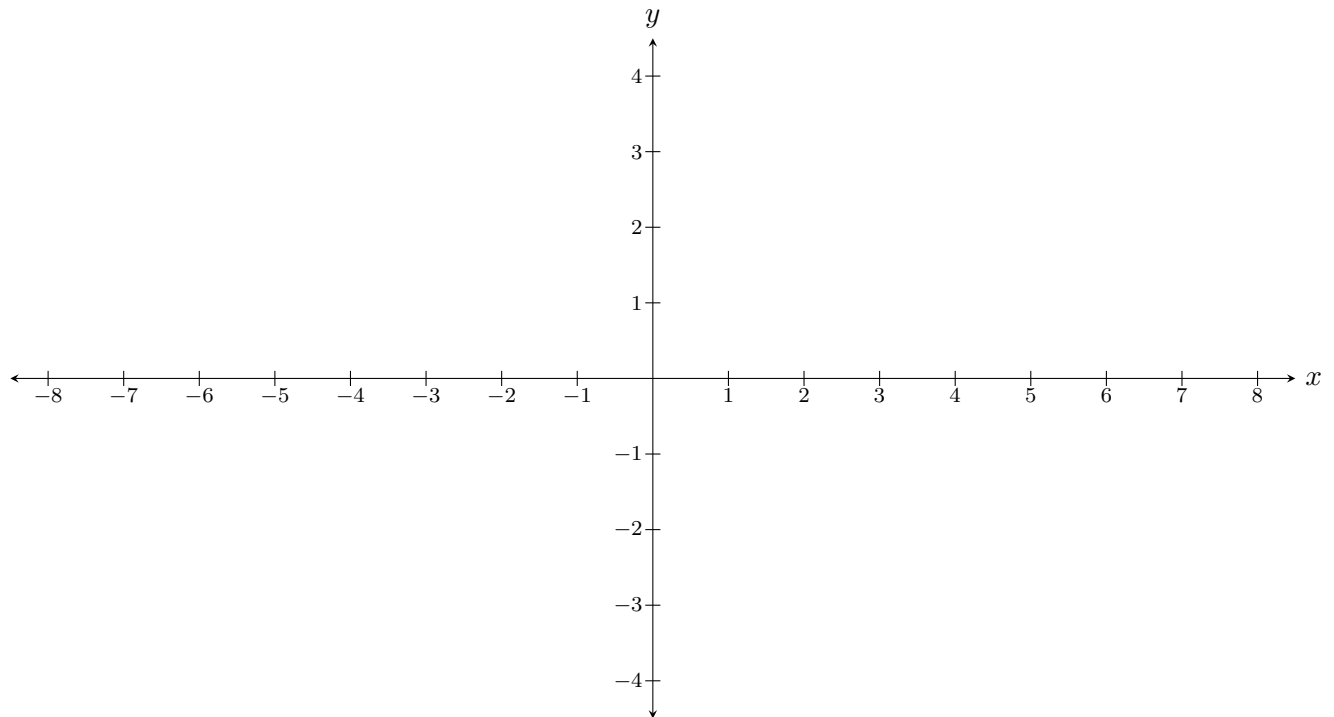
1. (10 pts.) This problem concerns the functions  $f(x) = \frac{\sqrt{x+2}}{\cos(x)+2}$  and  $g(x) = \sqrt{x} - 2$ .

(a) State the domain of  $f(x)$ .

(b)  $f \circ g(x) =$

2. (10 pts.) Consider the equation  $4 \sin^2(x) - 1 = 0$ . Find all solutions  $x$  that lie in the interval  $[0, 2\pi)$ .

3. (10 pts.) Sketch the graph of any function  $y = f(x)$  that meets the following four criteria: The line  $x = -1$  is a vertical asymptote, the line  $y = 2$  is a horizontal asymptote,  $f(1) = -2$ , and  $\lim_{x \rightarrow 3} f(x) = 0$ .



4. (20 pts.) Answer the following questions about the function  $y = f(x)$  graphed below.

(a)  $f(1) =$

(b)  $f \circ f(2) =$

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

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

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

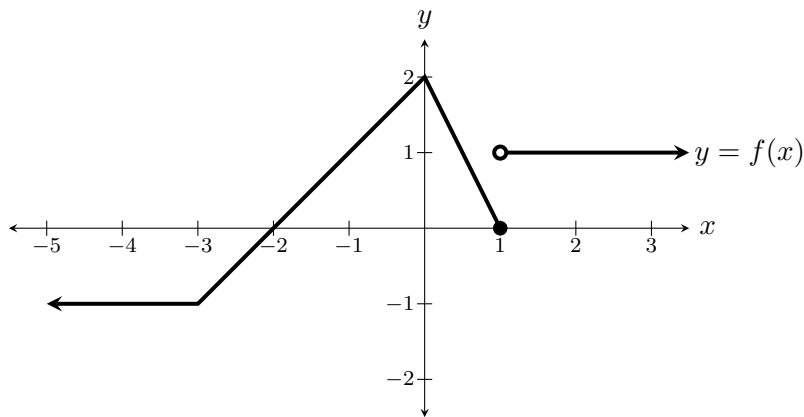
(f)  $\lim_{x \rightarrow 1^-} f(x) =$

(g)  $\lim_{x \rightarrow \infty} f(x) =$

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

(i) State an interval on which  $f(x)$  is continuous.

(j) State an  $x$ -value at which  $f(x)$  is discontinuous.



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5. (28 pts.) Evaluate the following limits.

If you want credit, show your steps, explain your reasoning, and carry limits as appropriate.

(a)  $\lim_{x \rightarrow 1} \frac{x^2 - 4x + 3}{x^2 + 4x - 5} =$

(b)  $\lim_{h \rightarrow 0} \frac{\sqrt{5+h} - \sqrt{5}}{h} =$

(c)  $\lim_{x \rightarrow 4^+} \frac{(-x+4)(x+2)}{|-x+4|} =$

(d)  $\lim_{\theta \rightarrow 0} \frac{1}{\theta} \tan(3\theta) =$

6. (12 pts.) Find all the horizontal asymptotes and vertical asymptotes of  $f(x) = \frac{x^2 + x - 2}{x^2 - x - 6}$ .

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7. (10 pts.) Find the value  $a$  such that the following  $f(x)$  is continuous at every number  $x$ .

$$f(x) = \begin{cases} x^2 - 2 & \text{if } x < 3 \\ ax & \text{if } x \geq 3 \end{cases}$$