

Name: _____

Sept. 14, 2012

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

MATH 200 – TEST 1 ♣

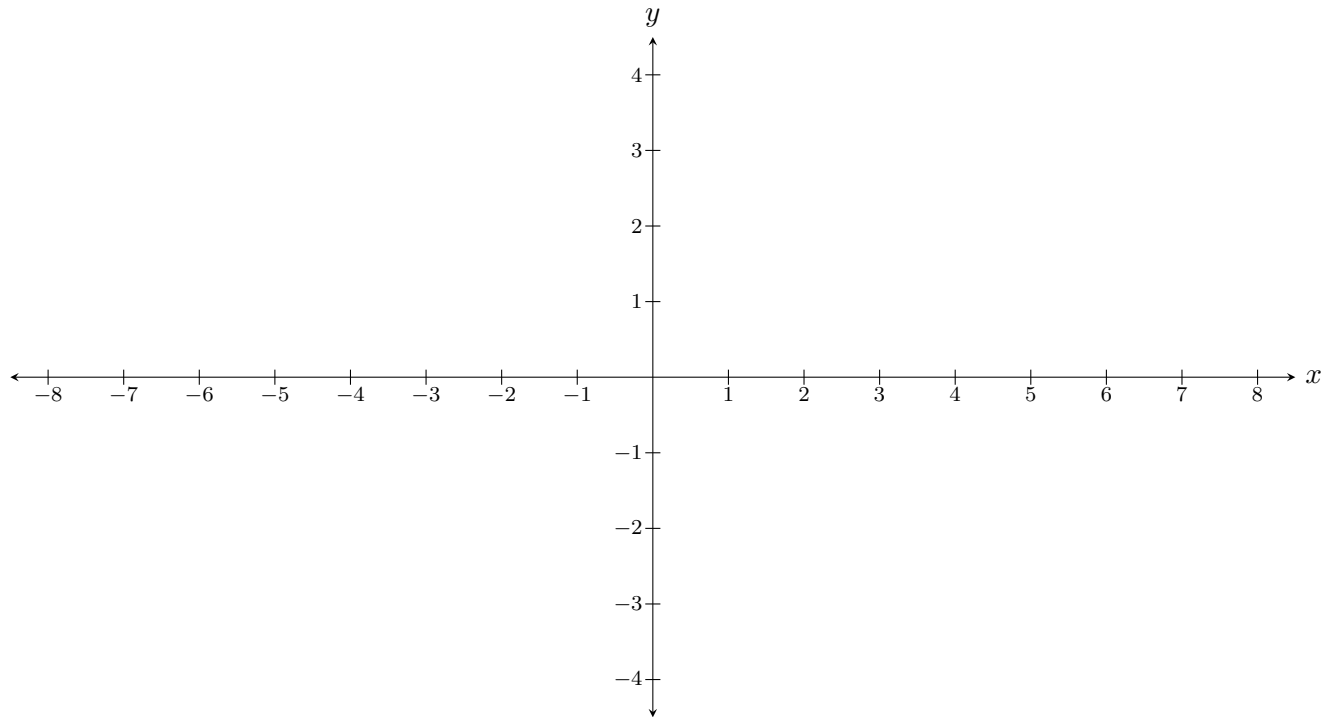
1. (10 pts.) This problem concerns the functions $f(x) = \frac{\sqrt{x+1}}{\sin(x)+4}$ and $g(x) = \sqrt{x} - 1$.

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

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

2. (10 pts.) Consider the equation $2\cos^2(x) - 1 = 0$. 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 $x = -4$ is a vertical asymptote, the line $y = 1$ is a horizontal asymptote, $f(4) = 2$, 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) $\lim_{x \rightarrow 1^+} f(x) =$

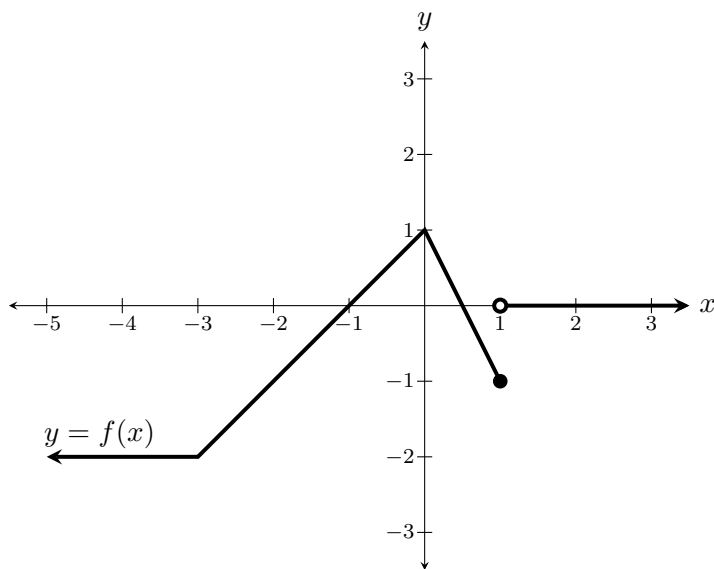
(f) $\lim_{x \rightarrow 1^-} f(x) =$

(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.



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

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

(a) $\lim_{x \rightarrow -2} \frac{x^2 - 4}{x^2 - x - 6} =$

(b) $\lim_{h \rightarrow 0} \frac{\sqrt{7+h} - \sqrt{7}}{h} =$

(c) $\lim_{x \rightarrow 3^+} \frac{(-x+3)(x+2)}{|-x+3|} =$

(d) $\lim_{\theta \rightarrow 0} \frac{\sec(\theta)}{\theta \csc(2\theta)} =$

6. (12 pts.) Find all the horizontal asymptotes and vertical asymptotes of $f(x) = \frac{x^2 - 2x - 3}{x^2 - 1}$.

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

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