Name:_____

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Math 113 Exam #1

1. What are the domain and range of the function $f(x) = \frac{1}{\sqrt{4-x}}$?

2. Evaluate

$$\lim_{x \to \infty} \frac{\sqrt{4x^2 - 8x + 7}}{17x + 12}$$

3. Let

$$f(x) = \begin{cases} \frac{x-2}{x^2-4} & \text{for } x \neq 2 \\ a & \text{for } x = 2 \end{cases}$$

If $f(x)$ is continuous at $x = 2$, then find the value of a.

4. Are there any solutions to the equation $\cos x = x$?

5. Determine the following limits, if they exist

   (a) $\lim_{x\to -1} \frac{x^2-2x+1}{x-1}$

   (b) $\lim_{x\to 1^-} \frac{x^2+2x+1}{x-1}$

6. Let

$$g(x) = \sqrt{x}$$

   Is g differentiable at 0? If so, what is $g'(0)$?

7. Let

$$f(x) = 2x^2 + 3x.$$

Is f differentiable at 1? If so, what is $f'(1)$?