

Math 263A**Guide for Test 1**

Here are some sample questions from sections 1.3–1.6. Some topics that we covered are not represented by these questions, but are still fair game.

1. Consider the function

$$f(x) = \begin{cases} x^2 & \text{if } x \leq -2 \\ Ax & \text{if } x > -2 \end{cases},$$

where A is some constant.

- (a) Find $\lim_{x \rightarrow -2^-} f(x)$. Is f continuous from the left at $x = -2$?
- (b) What value of A would make f continuous at $x = -2$?
- (c) Using the value of A that you just found, graph f .
2. Use the Intermediate Value Theorem to show that the equation $x^2 = \cos(x)$ has a solution.
3. Compute the following limits. If you use the squeeze theorem, then indicate the two functions that you are using to squeeze.

(a) $\lim_{x \rightarrow 2} \frac{x - 2}{x^2 - 5x + 6}$

(b) $\lim_{x \rightarrow 1} \frac{\sqrt{x} - 1}{x - 1}$

(c) $\lim_{x \rightarrow 0} x^2 \cos(3/x)$

(d) $\lim_{h \rightarrow 0} \frac{x^2 - (x - 2h)^2}{h}$

(e) $\lim_{t \rightarrow 0} \frac{\frac{1}{5+t} - \frac{1}{5}}{t}$

(f) $\lim_{x \rightarrow 2^+} \frac{x + 2}{x^2 - 5x + 6}$

(g) $\lim_{x \rightarrow -\infty} \frac{3x^3 - 4}{2x^3 - 2}$

(h) $\lim_{x \rightarrow \infty} \cos(1/x)$

(i) $\lim_{x \rightarrow \infty} (x - x^2)$