Math 241 Spring 2019 Professor MG
Classwork 1 Name: _____

Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise.

1. Find the following limits:

   (a) $\lim_{x\to 0} \dfrac{\sin(4y)}{7y}$

   (b) $\lim_{x\to 0} \dfrac{\tan x}{x}$ (Hint: Rewrite $\tan x$ first)

   (c) $\lim_{x\to\infty} \dfrac{x^2+8}{6x^2-x}$

   (d) $\lim_{x\to\infty} \dfrac{5x^3+7x-8}{-4x^2-2x+1}$

   (e) $\lim_{x\to\infty} \dfrac{x^2-5x-9}{2x^4+3x^3}$

   (f) $\lim_{t\to 2^-} \dfrac{t+2}{t-2}$

   (g) $\lim_{x\to 4} \dfrac{x-4}{\sqrt{x}-2}$

2. Find $\lim \dfrac{1}{x^2-4}$ as

   (a) $x \to 2^+$

   (b) $x \to 2^-$

   (c) $x \to -2^+$

   (d) $x \to -2^-$

3. It can be shown that the inequalities

$$1 - \frac{x^2}{6} < \frac{x\sin x}{2-2\cos x} < 1$$

   hold for all values of x close to zero. What, if anything, does this tell you about

$$\lim_{x\to 0} \frac{x\sin x}{2-2\cos x}?$$

   Give reasons for your answer.

4. Use the squeeze theorem to find $\lim_{x\to\infty} \dfrac{\sin 3x}{x}$.

5. On what interval(s) is the following function continuous?

$$f(x) = \begin{cases} \dfrac{x-6}{x-3} & x < 0 \\ 2 & x = 0 \\ \sqrt{4+x^2} & x > 0 \end{cases}$$

6. Is $f(x)$ continuous at $x = 1$ if $f(x) = \begin{cases} 8x-3 & x \le 1 \\ 4x^2+5 & x > 1 \end{cases}$? If not, is it continuous from the left, right, or neither?