Instructor Questions #1

Due: Mon Jan 15, 2018; 9:00pm

- **Directions:** Print double sided, write your solutions to both questions directly on this page, place immediately after cover page and staple together!
- **Marks:** An answer without a detailed solution process will be awarded zero marks!

Question 1

(a) Determine whether the given function is even, odd, or neither, and find its domain and zeros. State any horizontal asymptotes.

$$f(x) = \frac{x^2 - 1}{x^2 - 5x + 6}$$

(b) Draw the graph of a function that has the following properties:

- $f(x)$ is discontinuous only at $x = 2$ and $x = 3$
- $\lim_{x \to 2^-} f(x) \neq \lim_{x \to 2^+} f(x)$
- $\lim_{x \to 2^-} f(x) = f(2)$
- $\lim_{x \to 3} f(x)$ exists
- $f(x)$ is defined at $x = 3$

Question 2

For some given constants a and b, consider the function

$$f(x) = \begin{cases} x^2 & x \leq 2 \\ a + bx & 2 < x < 4 \\ |10 - x| & x \geq 4 \end{cases}$$

(a) Find $\lim_{x \to 2^-} f(x)$

(b) Find $\lim_{x \to 4^+} f(x)$

(c) For what values of a and b is the function $f(x)$ continuous?