

**Tutorial Sheet**  
**Assignment PS-2 due 10/14/2025 at 05:00pm BST**

**2526-MA140**

**Problem 1. (1 point)**

Use the Squeeze Theorem to evaluate the limit  $\lim_{x \rightarrow 2} f(x)$ , if

$$4x - 4 \leq f(x) \leq x^2 \quad \text{on } [0, 4].$$

Enter **DNE** if the limit does not exist.

Limit = \_\_\_\_\_

**Problem 2. (1 point)**

A function is given below. Evaluate the indicated limits numerically.

$$f(x) = \frac{x^2 + 8x + 16}{x^3 - 5x^2 - 48x + 252}$$

Enter **INF** for  $\infty$ , **-INF** for  $-\infty$ , or **DNE** if the limit does not exist, but is neither  $\infty$  nor  $-\infty$ .

a)  $\lim_{x \rightarrow 6^-} f(x) =$  \_\_\_\_\_

b)  $\lim_{x \rightarrow 6^+} f(x) =$  \_\_\_\_\_

c)  $\lim_{x \rightarrow 6} f(x) =$  \_\_\_\_\_

**Problem 3. (1 point)**

Evaluate the limits.

$$g(x) = \begin{cases} 4x + 4 & x < 7 \\ 28 & x = 7 \\ 4x - 4 & x > 7 \end{cases}$$

Enter **DNE** if the limit does not exist.

a)  $\lim_{x \rightarrow 7^-} g(x) =$  \_\_\_\_\_

b)  $\lim_{x \rightarrow 7^+} g(x) =$  \_\_\_\_\_

c)  $\lim_{x \rightarrow 7} g(x) =$  \_\_\_\_\_

d)  $g(7) =$  \_\_\_\_\_

**Problem 4. (1 point)**

Let

$$f(x) = \begin{cases} 12 & \text{if } x < -3 \\ -x + 9 & \text{if } -3 \leq x < 6 \\ 7 & \text{if } x = 6 \\ 9 & \text{if } x > 6. \end{cases}$$

Sketch the graph of this function and find the following limits, if they exist.

(If a limit does not exist, enter **DNE**.)

1.  $\lim_{x \rightarrow -3^-} f(x) =$  \_\_\_\_\_

2.  $\lim_{x \rightarrow -3^+} f(x) =$  \_\_\_\_\_

3.  $\lim_{x \rightarrow -3} f(x) =$  \_\_\_\_\_

4.  $\lim_{x \rightarrow 6^-} f(x) =$  \_\_\_\_\_

5.  $\lim_{x \rightarrow 6^+} f(x) =$  \_\_\_\_\_

6.  $\lim_{x \rightarrow 6} f(x) =$  \_\_\_\_\_

**Problem 5. (1 point)**

Let

$$f(x) = \begin{cases} b - 2x & \text{if } x < 5 \\ -\frac{150}{x - b} & \text{if } x \geq 5. \end{cases}$$

Find the two values of  $b$  for which  $f$  is a continuous function at 5.

The one with the greater absolute value is  $b =$ \_\_\_\_\_.

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**Problem 6.** (1 point)

**Warning! You may attempt this question only once!**

Sketch the graph of the function  $f$  to determine the type of discontinuity at each  $x$ -value.

$$f(x) = \begin{cases} x^2 + 2, & \text{if } x < -3 \\ -5, & \text{if } x = -3 \\ -3x + 2, & \text{if } -3 < x \leq 0 \\ -4x, & \text{if } 0 < x < 3 \\ \frac{(x-3)^2}{1}, & \text{if } 3 \leq x \end{cases}$$

- choose one
- removable
- jump
- infinite

1. What type of discontinuity does  $f$  have at  $x = -3$ ?

- choose one
- removable
- jump
- infinite

2. What type of discontinuity does  $f$  have at  $x = 0$ ?

- choose one
- removable
- jump
- infinite

3. What type of discontinuity does  $f$  have at  $x = 3$ ?