
(a) \( \sec\left(\frac{5\pi}{4}\right) = \) 

(b) Describe the domain of \( f(x) = \frac{x}{1 - \tan(x)} \).

(c) If \( f(x) = \frac{\sin(x)}{x} \) and \( g(x) = x + \sqrt{x} \), then \( f \circ g(x) = \) 

(d) \( \lim_{x \to 2} \left( \frac{1}{4} + \frac{8}{x^2} \right)^{\frac{3}{2}} = \)

(e) \( \lim_{x \to \frac{\pi}{2}} \cot(x) = \)

6. (15 points) Answer the questions about the function \( f(x) \) graphed below.

(a) \( \lim_{x \to -2^+} f(x) = \)

(b) \( \lim_{x \to -2^-} f(x) = \)

(c) \( \lim_{x \to 1} \frac{5f(x)}{1 + f(x)} = \)

(d) \( f \circ f(-1) = \)

(e) At which values \( c \) is \( f(x) \) not continuous at \( x = c \)?
2. (15 points) Find all solutions of the equation
\[ \cos^2(x) - \cos(x) \sin(x) = 0, \quad \text{where} \quad 0 \leq x \leq 2\pi. \]

3. (15 points) Sketch the graph of any function that meets the following criteria.

(a) \( f(1) = 2 \)
(b) \( \lim_{x \to \infty} f(x) = 0 \) and \( \lim_{x \to -\infty} f(x) = 0 \)
(c) \( \lim_{x \to 0^+} f(x) = 3 \) and \( \lim_{x \to 0^-} f(x) = 1 \)
(d) Lines \( x = 2 \) and \( x = 5 \) are vertical asymptotes.
(e) \( \lim_{x \to -4} f(x) = 2 \)
(f) \( f(x) \) is not continuous at \( x = -4 \)
4. (15 points) Evaluate the following limits.

(a) \[ \lim_{x \to 0} \frac{\sin(7x)}{5x} = \]

(b) \[ \lim_{x \to 3} \frac{\sqrt{x} - \sqrt{3}}{x - 3} = \]

(c) \[ \lim_{h \to 0} \frac{\frac{1}{6+h} - \frac{1}{6}}{h} = \]

5. (15 points) This question concerns the function \( f(x) = \frac{x^2 - 1}{7x^3 - 7x^2} \).

(a) State the intervals on which \( f(x) \) is continuous.

(b) Find the horizontal asymptotes (if any).

(c) Find the vertical asymptotes (if any).