

Calculus I

Section 1.3 Homework

1) $f(x) =$ _____ (see textbook)

a) $\lim_{x \rightarrow 4^-} f(x) =$ _____ $\lim_{x \rightarrow 4^+} f(x) =$ _____ $\lim_{x \rightarrow 4} f(x) =$ _____

b) $\lim_{x \rightarrow -1^-} f(x) =$ _____ $\lim_{x \rightarrow -1^+} f(x) =$ _____ $\lim_{x \rightarrow -1} f(x) =$ _____

3) $f(x) =$ _____ (see textbook)

a) $\lim_{x \rightarrow 0^-} f(x) =$ _____ $\lim_{x \rightarrow 0^+} f(x) =$ _____ $\lim_{x \rightarrow 0} f(x) =$ _____

b) $\lim_{x \rightarrow \pi/3^-} f(x) =$ _____ $\lim_{x \rightarrow \pi/3^+} f(x) =$ _____ $\lim_{x \rightarrow \pi/3} f(x) =$ _____

7) $f(x) =$ _____ (see textbook)

$\lim_{x \rightarrow 0^-} f(x) =$ _____ $\lim_{x \rightarrow 0^+} f(x) =$ _____ $\lim_{x \rightarrow 0} f(x) =$ _____

11) $f(x) =$ _____ (see textbook)

$\lim_{x \rightarrow -3^-} f(x) =$ _____ $\lim_{x \rightarrow -3^+} f(x) =$ _____ $\lim_{x \rightarrow -3} f(x) =$ _____

13) $f(x) =$ _____ (see textbook)

$\lim_{x \rightarrow 3^-} f(x) =$ _____ $\lim_{x \rightarrow 3^+} f(x) =$ _____ $\lim_{x \rightarrow 3} f(x) =$ _____

19) $f(x) =$ _____ (see textbook)

$\lim_{x \rightarrow 1^-} f(x) =$ _____ $\lim_{x \rightarrow 1^+} f(x) =$ _____ $\lim_{x \rightarrow 1} f(x) =$ _____

21) $f(x) =$ _____ (see textbook)

$\lim_{x \rightarrow 7^-} f(x) =$ _____ $\lim_{x \rightarrow 7^+} f(x) =$ _____ $\lim_{x \rightarrow 7} f(x) =$ _____

27) $f(x) =$ _____ (see textbook)

$\lim_{x \rightarrow \pi/2^-} f(x) =$ _____ $\lim_{x \rightarrow \pi/2^+} f(x) =$ _____ $\lim_{x \rightarrow \pi/2} f(x) =$ _____

29) $f(x) =$ _____ (see textbook)

$\lim_{x \rightarrow 1^-} f(x) =$ _____ $\lim_{x \rightarrow 1^+} f(x) =$ _____ $\lim_{x \rightarrow 1} f(x) =$ _____

33) $f(x) =$ _____ (see textbook)

$\lim_{x \rightarrow 5\pi/6^-} f(x) =$ _____ $\lim_{x \rightarrow 5\pi/6^+} f(x) =$ _____ $\lim_{x \rightarrow 5\pi/6} f(x) =$ _____

47) Note: $\frac{x}{x^2 - x} = \frac{(x)}{(x)(x-1)}$

a) Simplify: $\frac{(x)}{(x)(x-1)} = ?$

b) Find $\lim_{x \rightarrow 0} \frac{x}{x^2 - x} = \lim_{x \rightarrow 0} \frac{(x)}{(x)(x-1)} = ?$

51) Note: $\frac{x^2 + x - 6}{x^2 - 9} = \frac{(x+3)(x-2)}{(x+3)(x-3)}$

a) Simplify: $\frac{x^2 + x - 6}{x^2 - 9} = \frac{(x+3)(x-2)}{(x+3)(x-3)} = ?$

b) Find $\lim_{x \rightarrow -3} \frac{x^2 + x - 6}{x^2 - 9} = \lim_{x \rightarrow -3} \frac{(x+3)(x-2)}{(x+3)(x-3)} = ?$

55) Hint: $(\sqrt{a} - \sqrt{b})(\sqrt{a} + \sqrt{b}) = (\sqrt{a}\sqrt{a}) + (\sqrt{a}\sqrt{b}) - (\sqrt{a}\sqrt{b}) + (\sqrt{b}\sqrt{b}) = a - b$

a) Simplify: $\frac{(\sqrt{x+5} - \sqrt{5})}{x} \cdot \frac{(\sqrt{x+5} + \sqrt{5})}{(\sqrt{x+5} + \sqrt{5})} = ?$

b) $\lim_{x \rightarrow 0} \frac{\sqrt{x+5} - \sqrt{5}}{x} = \lim_{x \rightarrow -3} \frac{(\sqrt{x+5} - \sqrt{5})}{x} \cdot \frac{(\sqrt{x+5} + \sqrt{5})}{(\sqrt{x+5} + \sqrt{5})} = ?$

63) Hint: $\lim_{t \rightarrow 0} \frac{\sin t}{t} = 1$ (Theorem 1.9)

$\lim_{x \rightarrow 0} \frac{\sin x}{5x} = \lim_{x \rightarrow 0} \frac{1}{5} \cdot \frac{\sin x}{x} = \left(\lim_{x \rightarrow 0} \frac{1}{5} \right) \cdot \left(\lim_{x \rightarrow 0} \frac{\sin x}{x} \right) = (?)(?) = (?)$

83) $f(x) = 3x - 2$

a) $f(x + \Delta x) = \underline{\hspace{10cm}}$

b) $\frac{f(x + \Delta x) - f(x)}{\Delta x} = ?$

c) Find $\lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x} = ?$

84) $f(x) = -6x + 3$

a) $f(x + \Delta x) =$ _____

b) $\frac{f(x + \Delta x) - f(x)}{\Delta x} = ?$

c) Find $\lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x} = ?$

85) $f(x) = x^2 - 4x$

a) $f(x + \Delta x) =$ _____

b) $\frac{f(x + \Delta x) - f(x)}{\Delta x} = ?$

c) Find $\lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x} = ?$