

Math 16A: Short Calculus I
 Fall 2017, Section 3
 Homework Sheet 2
 Due: Friday, October 6, 2017

Submit your solutions to the following problems in lecture on the due date above. Present your work in a clean and organized fashion, either on a printed copy of this document (preferred) or a separate sheet of paper. As stated in the syllabus, late submissions will **not** be accepted.

1. Compute the following limits.

$$(a) \lim_{x \rightarrow -1} \sqrt{x^2 - 2x + 10} = \sqrt{1 + 2 + 10} = \boxed{\sqrt{13}}$$

$$(b) \lim_{x \rightarrow 3} \frac{x^2 - 3x}{x^2 + 9} = \frac{9 - 9}{9 + 9} = \boxed{0}$$

$$(c) \lim_{x \rightarrow 3} \frac{x^2 - 3x}{x^2 - 4x + 3} = \lim_{x \rightarrow 3} \frac{x(x-3)}{(x-3)(x-1)} = \lim_{x \rightarrow 3} \frac{x}{x-1} = \boxed{\frac{3}{2}}$$

plug in: $\frac{0}{0}$

$$(d) \lim_{x \rightarrow 2} \frac{\sqrt{5x-1} - 3}{x-2} = \lim_{x \rightarrow 2} \frac{\sqrt{5x-1} - 3}{x-2} \cdot \frac{\sqrt{5x-1} + 3}{\sqrt{5x-1} + 3} = \lim_{x \rightarrow 2} \frac{5x-1-9}{(x-2)(\sqrt{5x-1} + 3)} = \lim_{x \rightarrow 2} \frac{5x-10}{(x-2)(\sqrt{5x-1} + 3)} = \lim_{x \rightarrow 2} \frac{5}{\sqrt{5x-1} + 3} = \boxed{\frac{5}{6}}$$

plug in: $\frac{0}{0}$

$$(e) \lim_{x \rightarrow 2^-} \frac{|3x-6|}{\sqrt{x+2} - 2} = \lim_{x \rightarrow 2^-} \frac{-(3x-6)}{\sqrt{x+2} - 2} = \lim_{x \rightarrow 2^-} \frac{-(3x-6)}{\sqrt{x+2} - 2} \cdot \frac{\sqrt{x+2} + 2}{\sqrt{x+2} + 2} = \lim_{x \rightarrow 2^-} \frac{-3(x-2)}{(x-2)(\sqrt{x+2} + 2)} = \lim_{x \rightarrow 2^-} \frac{-3}{\sqrt{x+2} + 2} = \boxed{-12}$$

plug in: $\frac{0}{0}$

$|3x-6| = \begin{cases} 3x-6, & x \geq 2 \\ -(3x-6), & x < 2 \end{cases}$

$$(f) \lim_{x \rightarrow \infty} \frac{(8x^3 - 2x + 1)/x^3}{(2x^3 + 7x + 257)/x^3} = \lim_{x \rightarrow \infty} \frac{8 - \frac{2}{x^2} + \frac{1}{x^3}}{2 + \frac{7}{x^2} + \frac{257}{x^3}} = \frac{8}{2} = \boxed{4}$$

$$(g) \lim_{x \rightarrow \infty} \frac{(x^2 - x)/x}{(27x + 2576)/x} = \lim_{x \rightarrow \infty} \frac{x-1}{27 + \frac{2576}{x}} = \boxed{\infty}$$