

Worksheet 1

SI with Ian

Week of September 1st

Feel free to use notes and other resources, however, please do not use online calculators. Also if you are printing this worksheet out before hand (thank you) please wait to complete the worksheet until the SI session.

1 Review Problems

- 1 Complete the square:

$$f(x) = 5x - x^2$$

- 2 Rationalize the Numerator and Simplify:

$$\frac{\sqrt{x+5} - \sqrt{x}}{10}$$

- 3 Given the function $f(x) = \frac{5}{2x-3}$ determine the difference quotient $\left(\frac{f(x+h) - f(x)}{h}\right)$ and simplify. *Note the denominator should not have h as one of its factors when you are finished.*

2 Content Problems

- 4 The position of an object is given by: $s(t) = (8t)(t+6)^{3/2}$. Approximate the average velocity by evaluating the function at times $t = 10$, $t = 9$, $t = 9.9$ and $t = 9.99$.

- 5 If $f(x) = \begin{cases} x+2 & x \leq 0 \\ 2-x & x > 0 \end{cases}$ Find $\lim_{x \rightarrow 0} f(x)$.

- 6 Find $\lim_{x \rightarrow 0} x^2 \cos\left(\frac{1}{x^2}\right)$.

3 Challenge Problems

7 Find $\lim_{x \rightarrow \pm\infty} f(x) = \frac{x+8}{\sqrt{2x^2+3}}$.

8 Find the vertical asymptote(s) of the function

$$g(x) = \frac{-8}{(x+5)(x-9)}$$

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