

2.4 Rates of Change and Tangent Lines Day 2

Ex 1) If $f(x) = \begin{cases} x^2 + 5 & x < 2 \\ 7x - 5 & x \geq 2 \end{cases}$ for all real #'s

then which of the following must be true?

- A. $f(x)$ is continuous everywhere.
- B. $f(x)$ is continuous everywhere except $x = 2$.
- C. $f(x)$ is continuous everywhere except $x = -2$ and 2 .

Ex 2) If the function f is continuous for all real numbers and if $f(x) = \frac{x^2 - 7x + 12}{x - 4}$ when $x \neq 4$

then $f(4) = ?$

- A. 1
- B. $8/7$
- C. -1
- D. 0
- E. undefined

Ex 3)

$$\lim_{x \rightarrow 5} \frac{x^2 - 25}{x - 5}$$

- A. 0
- B. 10
- C. -10
- D. 5
- E. Does not exist

$$\lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

- Slope at a given point
- Slope of the tangent line
- Numerical Derivative

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

Find the slope at $x = 1$

Ex 5) $f(x) = \frac{1}{x - 3}$

Find the slope at $x = 4$

Ex 6) $f(x) = \sqrt{x}$ Find the slope at $x = 4$

Then write an equation for the tangent line
and normal line.