

Prologue/Rapid-fire round: Midterm 1 Review

Do not take much time on this section—if this stuff isn't automatic for you, go back to chapters 2 and 3!!

-2.)

Compute the following limits or state they do not exist.

a.)

$$\lim_{x \rightarrow 3} \frac{x^2 - 9}{x^2 + x - 12}$$

b.)

$$\lim_{x \rightarrow \infty} \frac{6x^{-2} + 2x^{-1} - 1}{8x^{-5} + 2}$$

c.)

$$\lim_{x \rightarrow -2} \frac{|x^2 - 3x + 10|}{x^2 + 5x + 6}$$

d.)

$$\lim_{x \rightarrow \infty} \frac{(x \cos(\sqrt{x}))^2}{x^3 + 7}$$

-1.)

Given $f(x)$, find $f'(x)$ and use it to compute $T(x)$, the tangent line to $y = f(x)$ and $x = x_0$.

a.)

$$f(x) = \frac{x^3 + 10x}{e^x}$$

$$x_0 = 1$$

b.)

$$f(x) = \sqrt{e^x + \tan x}$$

$$x_0 = 0$$

c.)

$$f(x) = \ln(x^3 + 3^x)$$

$$x_0 = 2$$

0.)

Use the definition of derivative to find $f'(x)$. Check your work using rules of differentiation. Also, state the domain of f

$$f(x) = \sqrt{2x^2 - 1}$$