If $y = -3x^2 - 2x + 1$ **, use the definition of a derivative to determine y'.**

$f(4)$

$-3(4)^2 - 2(4) + 1$

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$\lim_{h \to 0} \frac{-3(x+h)^2 - 2(x+h) + 1 - (-3x^2 - 2x + 1)}{h}$$

$$\lim_{h \to 0} \frac{-3(x^2 + 2xh + h^2) \cancel{-2x} - 2h \cancel{+1} + 3x^2 \cancel{+2x} \cancel{-1}}{h}$$

$$\lim_{h \to 0} \frac{\cancel{-3x^2} - 6xh - 3h^2 - 2h \cancel{+3x^2}}{h}$$

$$\lim_{h \to 0} \frac{-6xh - 3h^2 - 2h}{h}$$

$$\lim_{h \to 0} \frac{\cancel{h}(-6x - 3h - 2)}{\cancel{h}}$$

$$\boxed{f'(x) = -6x - 2}$$

Feb 11-9:59 AM

$y = x^2$

$y' = 2x$

$y = 2x^2 - 5x + 6$

$y' = 4x - 5$

$y = -3x^2 - 2x + 1$

$y' = -6x - 2$

$y = 8x^2 + 10x - 8$

$y' = 16x + 10$

Calculus 120

Unit 1: Rate of Change and Derivatives

February 8, 2019: Day #7

1. Assignment Due on Wednesday

2. Quick Quiz ~~Tuesday~~ Wednesday on Derivatives

Jan 9-1:43 PM

Curriculum Outcomes

C1. Explore the concepts of average and instantaneous rate of change.

Jan 24-9:32 AM

Ex:

Find y' and the slope of the tangent line at x = -5 for f(x) = x³ + x + 2

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$\lim_{h \to 0} \frac{(x+h)^3 + x + h + 2 - (x^3 + x + 2)}{h}$$

$(x+h)^3$

$(x+h)(x+h)(x+h)$

$(x^2+2xh+h^2)(x+h)$

$x^3 + x^2h + 2x^2h$
$+ 2xh^2 + xh^2 + h^3$

$$\lim_{h \to 0} \frac{\cancel{x^3} + 3x^2h + 3xh^2 + h^3 + \cancel{x} + h + \cancel{2} - \cancel{x^3} - \cancel{x} - \cancel{2}}{h}$$

$$\lim_{h \to 0} \frac{3x^2h + 3xh^2 + h^3 + h}{h}$$

$$\lim_{h \to 0} \frac{\cancel{h}(3x^2 + 3xh + h^2 + 1)}{\cancel{h}}$$

$f'(x) = 3x^2 + 1$

$f'(-5) = 3(-5)^2 + 1$

$\boxed{m = 76}$

Feb 7-11:13 AM

If $f(x)=\sqrt{x+2}$ **, find** $f'(x)$ **. State the domains of f and f'.**

Domain: $[-2,\infty)$

$(x-5)(x+5)$

x^2-25

$$f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$$

$$=\lim_{h\to 0}\left(\frac{\sqrt{x+h+2}-\sqrt{x+2}}{h}\right)\left(\frac{\sqrt{x+h+2}+\sqrt{x+2}}{\sqrt{x+h+2}+\sqrt{x+2}}\right)$$

$$=\lim_{h\to 0}\frac{\cancel{x}+h+\cancel{2}-(\cancel{x}+\cancel{2})}{h(\sqrt{x+h+2}+\sqrt{x+2})}$$

$$=\lim_{h\to 0}\frac{\cancel{h}}{\cancel{h}(\sqrt{x+h+2}+\sqrt{x+2})}$$

$$=\lim_{h\to 0}\frac{1}{\sqrt{x+h+2}+\sqrt{x+2}}$$

$$=\frac{1}{\sqrt{x+2}+\sqrt{x+2}}$$

$$f'(x)=\frac{1}{2\sqrt{x+2}}$$

$\rightarrow$ Domain: $(-2,\infty)$

Find f' if $f(x)=\frac{x+1}{3x-2}$. Determine the equation the tangent line to f(x) at x = 1 and the equation of the normal line to f(x) at x = 1.

$$\lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$$

$$\lim_{h\to 0} \frac{\frac{x+h+1}{3(x+h)-2} - \frac{x+1}{3x-2}}{h}$$

$$\lim_{h\to 0} \frac{\left(\frac{x+h+1}{3x+3h-2}\right)\frac{(3x-2)}{(3x-2)} - \left(\frac{x+1}{3x-2}\right)\frac{(3x+3h-2)}{(3x+3h-2)}}{h}$$

$$\lim_{h\to 0} \frac{\frac{\cancel{3x^2}-\cancel{2x}+\cancel{3xh}-2h+\cancel{3x}-\cancel{2}-(\cancel{3x^2}+\cancel{3xh}-\cancel{2x}+\cancel{3x}+3h-\cancel{2})}{(3x+3h-2)(3x-2)}}{h}$$

$$\lim_{h\to 0} \left(\frac{-5\cancel{h}}{(3x+3h-2)(3x-2)}\right)\left(\frac{1}{\cancel{h}}\right)$$

$$\lim_{h\to 0} \frac{-5}{(3x+3h-2)(3x-2)}$$

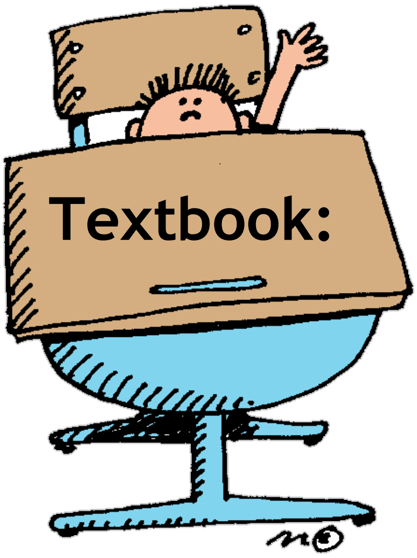
$$f'(x) = \frac{-5}{(3x-2)^2}$$

$$f'(x) = \frac{(3x-2)(1)-(x+1)(3)}{(3x-2)^2}$$

$$= \frac{\cancel{3x}-2-\cancel{3x}-3}{(3x-2)^2}$$

$$= \frac{-5}{(3x-2)^2}$$

Feb 8-9:51 AM



Practice

Page 105-106
#1, 3, 7, 9, 10, 11, 12, 17, 18, 19

Feb 4-3:38 PM

Attachments

2.1_74_AP.html

2.1_74_AP.swf

2.1_74_AP.html