

September 28, 2016

$$g(x) = -x^2 - 1 - 2x$$

$$f(x) = x + 5$$

#1 find  $(g \circ f)(x)$

$$= -x^2 - 1 - 2x - (x + 5)$$

$$= -x^2 - 1 - 2x - x - 5$$

$$= -x^2 - 6 - 3x$$

$$= -x^2 - 3x - 6$$

Sep 28-1:29 PM

#2 find  $(g \circ f)(-4)$

$$= [(-4)^2 - 1 - 2(-4)] [(-4) + 5]$$

$$= [-16 - 1 + 8] [1]$$

$$= [-9] [1]$$

$$= -9$$

Sep 28-1:33 PM

#3 find  $(g \circ f)(x) = g(f(x))$

$$= -(x+5)^2 - 1 - 2(x+5)$$

$$= -[(x+5)(x+5)] - 1 - 2x - 10$$

$$= -[x^2 + 10x + 25] - 1 - 2x - 10$$

$$= -x^2 - 10x - 25 - 1 - 2x - 10$$

$$= -x^2 - 12x - 36$$

Sep 28-1:35 PM

Slope:  $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$

Rate of Change

Sep 28-1:52 PM

Average Rate of Change

$$\frac{f(b) - f(a)}{b - a}$$

Sep 28-2:00 PM

Instant Change

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

Sep 28-2:05 PM

Difference Quotient

$$f(x) = x^2 + 2x + 1 \quad \leftarrow \frac{f(x+h) - f(x)}{h}$$

$$= \frac{(x+h)^2 + 2(x+h) + 1 - (x^2 + 2x + 1)}{h}$$

FOIL

$$= \frac{(x+h)(x+h) + 2x + 2h + 1 - x^2 - 2x - 1}{h}$$

$$= \frac{x^2 + 2xh + h^2 + 2x + 2h + 1 - x^2 - 2x - 1}{h}$$

$$= \frac{2xh + h^2 + 2h}{h}$$

$$= \frac{h(2x + h + 2)}{h}$$

$$= \boxed{2x + h + 2}$$

Sep 28-2:15 PM