

Thursday, September 19

If $f(x) = x^2 + 3x$ and $g(x) = \sin(x)$

What is $f(g(x))$?

What is $g(f(x))$?

$$f(g(x)) = (\sin x)^2 + 3(\sin x)$$

$$g(f(x)) = \sin(x^2 + 3x)$$

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Students will verbally explain how to
find the derivative

(using the words:
function, exponent, coefficient...)

Chain Rule:

The derivative of the outside function
leaving the inside function alone
times
the derivative of the inside function.

$$\frac{d}{dx} (f(g(x))) = f'(g(x)) g'(x)$$

$$f(x)$$

$$f'(x)$$

$$h(x) = g(f(x)) = \sin(x^2 + 3x)$$

$$h(x) = \sin(x^2 + 3x)$$

find $h'(x)$

$$m(x) =$$

$$f(g(x)) = (\sin x)^2 + 3(\sin x)$$

$$m(x) = (\sin x)^2 + 3(\sin x)$$

find $m'(x)$

$$h'(x) = \cos(x^2 + 3x)(2x + 3)$$

the derivative of the outside:
 $\sin(\quad)$

leaving the inside alone

times the derivative of the inside

$$m'(x) = 2(\sin x)(\cos x) + 3 \cos x$$