

MA 16010 Quiz 5 (Lessons 10, 11)

Write your name, section number (399 for 8:30, 418 for 9:30), and quiz number on the top of your quiz, **front and back**.

You may use a one-line calculator.

Compute  $f'(x)$  when

1.

$$f(x) = \frac{x^2 + 3}{x + 5},$$

2.

$$f(x) = \sin(e^x + 3x)$$

1.

$$f'(x) = \frac{(2x) \cdot (x+5) - (1) \cdot (x^2+3)}{(x+5)^2} = \frac{2x^2 + 10x - x^2 - 3}{(x+5)^2}$$

$$= \frac{x^2 + 10x - 3}{(x+5)^2}$$

quotient rule:

$$\left( \frac{f(x)}{g(x)} \right)' = \frac{f'(x)g(x) - g'(x)f(x)}{g(x)^2}$$

2.

$$f'(x) = \cos(e^x + 3x) \cdot \frac{d}{dx}[e^x + 3x] =$$

$$= \cos(e^x + 3x) \cdot (e^x + 3)$$

chain rule:

$$\frac{d}{dx}[h(g(x))] = h'(g(x)) \cdot g'(x)$$

here  $h(u) = \sin(u) \Rightarrow h'(u) = \cos u$ ,

$$g(x) = e^x + 3x \Rightarrow g'(x) = e^x + 3$$