

**Quiz #7: Monday, Oct 31**

Name: \_\_\_\_\_ Solution Key \_\_\_\_\_

Recitation R02 (M)

Find the derivative of each function below. Simplify your answers.

1.  $f(x) = x^3e^{3x}$

*Solution:* By the product rule,

$$f'(x) = (x^3)'e^{3x} + x^3(e^{3x})' = 3x^2e^{3x} + x^3(3e^{3x}) = (3x^2 + 3x^3)e^{3x}.$$

2.  $g(t) = \frac{2t+3}{t+2}$

*Solution:* By the quotient rule,

$$g'(t) = \frac{(2)(t+2) - (2t+3)(1)}{(t+2)^2} = \frac{2t+4-2t-3}{(t+2)^2} = \frac{1}{(t+2)^2}.$$

**Quiz #7: Monday, Oct 31**

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Recitation R02 (M)

Find the derivative of each function below. Simplify your answers.

1.  $f(x) = \frac{1 - 2x}{x - 1}$

*Solution:* By the quotient rule,

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

2.  $g(t) = t^3 e^{-t}$

*Solution:* By the product rule,

$$g'(t) = (t^3)'e^{-t} + t^3(e^{-t})' = 3t^2 e^{-t} + t^3(-e^{-t}) = (3t^2 - t^3)e^{-t}.$$

**Quiz #7: Tuesday, Nov 1**

Name: \_\_\_\_\_ Solution Key \_\_\_\_\_

Recitation R04 (Tu)

Find the derivative of each function below. Simplify your answers.

1.  $f(x) = x^2e^{4x}$

*Solution:* By the product rule,

$$f'(x) = (x^2)'e^{4x} + x^2(e^{4x})' = 2xe^{4x} + x^2(4e^{4x}) = (2x + 4x^2)e^{4x}.$$

2.  $g(t) = \frac{3t+1}{t+1}$

*Solution:* By the quotient rule,

$$g'(t) = \frac{(3)(t+1) - (3t+1)(1)}{(t+1)^2} = \frac{3t+3-3t-1}{(t+1)^2} = \frac{2}{(t+1)^2}$$

**Quiz #7: Tuesday, Nov 1**

Name: \_\_\_\_\_ Solution Key \_\_\_\_\_

Recitation R04 (Tu)

Find the derivative of each function below. Simplify your answers.

1.  $f(x) = \frac{4 - 3x}{x - 2}$

*Solution:* By the quotient rule,

$$f'(x) = \frac{(-3)(x - 2) - (4 - 3x)(1)}{(x - 2)^2} = \frac{-3x + 6 - 4 + 3x}{(x - 2)^2} = \frac{2}{(x - 2)^2}$$

2.  $g(t) = t^2 \ln t$

*Solution:* By the product rule,

$$g'(t) = (t^2)' \ln t + t^2 (\ln t)' = 2t \ln t + t^2 \cdot \frac{1}{t} = 2t \ln(t) + t.$$

**Quiz #7: Wednesday, Nov 2**

Name: \_\_\_\_\_ Solution Key \_\_\_\_\_

Recitation R03 (W)

Find the derivative of each function below. Simplify your answers.

1.  $f(x) = x^3 \ln x$

*Solution:* By the product rule,

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

2.  $g(t) = \frac{3t-1}{t+2}$

*Solution:* By the quotient rule,

$$g'(t) = \frac{(3)(t+2) - (3t-1)(1)}{(t+2)^2} = \frac{3t+6-3t+1}{(t+2)^2} = \frac{7}{(t+2)^2}.$$

**Quiz #7: Wednesday, Nov 2**

Name: \_\_\_\_\_ Solution Key \_\_\_\_\_

Recitation R03 (W)

Find the derivative of each function below. Simplify your answers.

1.  $f(x) = \frac{2x + 4}{x + 3}$

*Solution:* By the quotient rule,

$$f'(x) = \frac{(2)(x + 3) - (2x + 4)(1)}{(x + 3)^2} = \frac{2x + 6 - 2x - 4}{(x + 3)^2} = \frac{2}{(x + 3)^2}.$$

2.  $g(t) = t^4 e^{-t}$

*Solution:* By the product rule,

$$g'(t) = (t^4)'e^{-t} + t^4(e^{-t})' = 4t^3 e^{-t} + t^4(-e^{-t}) = (4t^3 - t^4)e^{-t}.$$