

Name: _____

Homework 2, due on Mon 17 Feb.

Differentiation with the Product Rule

Find the derivative of each function below.

1. (2 pts) $f(x) = \sqrt{x}e^x = x^{1/2}e^x$

$$f'(x) = \left[\frac{1}{2} x^{-1/2} \right] e^x + x^{1/2} [e^x]$$

$$\text{or } \left(\frac{1}{2\sqrt{x}} + \sqrt{x} \right) e^x$$

2. (2 pts) $f(x) = xe^x \cos x$

$$f'(x) = [1] e^x \cos x + x [e^x] \cos x + xe^x [-\sin x]$$

$$= e^x \cos x + xe^x \cos x - xe^x \sin x$$

3. (2 pts) $f(x) = x^{-4/7} \tan x$

$$f'(x) = \left[-\frac{4}{7} x^{-11/7} \right] \tan x + x^{-4/7} [\sec^2 x]$$

4. (2 pts) $f(x) = 2e^x \sec x$

$$f'(x) = 2[e^x] \sec x + 2e^x [\sec x \tan x]$$

5. (2 pts) $f(x) = (2x^3 - 3x^2) \csc x$

$$f'(x) = [6x^2 - 6x] \csc x + (2x^3 - 3x^2) [-\csc x \cot x]$$