Coastal Carolina University
Math 160 - Derivative Mastery Test

Fall 2017

Name _____

Find the derivative of each of the following functions. The final answer (and only the final answer) must be put on the answer line. You do not need to simplify your answer.

(1) $f(x) = e^2 + 3x^5 + \ln(x)$

Ans: $f'(x) = 15x^4 + \frac{1}{x}$

(2) $f(x) = e^x - \sqrt{x}$

Ans: $f'(x) = e^x - \frac{1}{2\sqrt{x}}$

(3) $f(x) = \sqrt[3]{x}$

$= x^{1/3}$

Ans: $f'(x) = \frac{1}{3}x^{-2/3}$

(4) $f(x) = (x^2 + 3x^4)\tan(x)$

Ans: $f'(x) = (2x + 12x^3)\tan x + (x^2+3x^4)\sec^2 x$

(5) $f(x) = \sec(x)$

Ans: $f'(x) = \sec x \tan x$

(6) $f(x) = \dfrac{x^3 - 2x^2}{3 + 2x^3}$

Ans: $f'(x) = \dfrac{(3x^2 - 4x)(3 + 2x^3) - 6x(x^3 - 2x^2)}{(3 + 2x^3)^2}$

(7) $f(x) = \arctan(x)$

Ans: $f'(x) = \dfrac{1}{1 + x^2}$

(8) $f(x) = \ln(x^2 + 4x)$

Ans: $f'(x) = \dfrac{1}{x^2 + 4x} \cdot (2x + 4)$

(9) $f(x) = \sin(\pi/6)$

Ans: $f'(x) = 0$

(10) $f(x) = \dfrac{1}{1 + x^2}$

Ans: $f'(x) = \dfrac{-2x}{(1 + x^2)^2}$

(11) $f(x) = \sqrt{5x + 3x^2}$

$f'(x) = \frac{1}{2\sqrt{5x+3x^2}} \cdot (5+6x)$

Ans: _____

(12) $f(x) = x \arcsin(x)$ $f'(x) = 1 \cdot \arcsin x + x \cdot \frac{1}{\sqrt{1-x^2}}$

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

Ans: _____

(13) $f(x) = \cos^2(x)$

$f'(x) = -2\cos x \sin x$

Ans: _____

(14) $f(x) = \log_2(x)$

$f'(x) = \frac{1}{x \ln 2}$

Ans: _____

(15) $f(x) = \sec^2(x)$ $= (\sec x)^2$

$f'(x) = 2\sec x \cdot \sec x \tan x$

$f'(x) = 2\sec^2 x \tan x$

Ans: _____

(16) $f(x) = \dfrac{1}{x}$

Ans: $f'(x) = \dfrac{-1}{x^2}$

(17) $f(x) = 7^{(x^2+x)}$

Ans: $f'(x) = 7^{(x^2+x)} \ln(7) \cdot (2x+1)$

(18) $f(x) = (x^4 + x^3)^{12}$

Ans: $f'(x) = 12(x^4+x^3)^{11} \cdot (4x^3+3x^2)$

(19) $f(x) = x^3 \sin^2(x)$

$f'(x) = 3x^2 \sin^2 x + x^3 \cdot 2 \sin x \cos x$

Ans: $f'(x) = 3x^2 \sin^2 x + 2x^3 \sin x \cos x$

(20) $f(x) = \dfrac{(x^2+2x)^3}{\sin(x)}$

$f'(x) = \dfrac{3(x^2+2x)^2(2x+2)\sin x - (x^2+2x)^3 \cos x}{\sin^2 x}$

Ans: _____