

Solution Key

NAME: _____

Panther ID: _____

Quiz 2 - MAC 2281, Spring 2019

To receive credit you MUST SHOW ALL YOUR WORK. Answers which are not supported by work will not be considered.

1. (8 pts) Compute the derivative of each of the following functions. You don't have to simplify.

(a) $y = (x^3+x)^6$

$$y' = 6(x^3+x)^5 (x^3+x)'$$

$$y' = 6(x^3+x)^5 (3x^2+1)$$

(b) $y = x^2 e^{-3x}$

$$y' = (x^2)' e^{-3x} + x^2 (e^{-3x})'$$

$$y' = 2x e^{-3x} + x^2 e^{-3x} (-3x)'$$

$$y' = 2x e^{-3x} + x^2 e^{-3x} (-3)$$

$$y' = 2x e^{-3x} - 3x^2 e^{-3x}$$

(c) $y = \sec(\tan x)$

$$y' = \sec(\tan x) \tan(\tan x) \cdot (\tan x)'$$

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

$$y = \sin^4(\sqrt{x}) \Rightarrow y = (\sin(\sqrt{x}))^4$$

$$y' = 4 \sin^3(\sqrt{x}) \cdot (\sin \sqrt{x})'$$

$$y' = 4 \sin^3(\sqrt{x}) \cdot \cos(\sqrt{x}) \cdot (\sqrt{x})'$$

$$y' = 4 \sin^3(\sqrt{x}) \cos(\sqrt{x}) \cdot \frac{1}{2} x^{-\frac{1}{2}}$$

$$y' = \frac{2 \sin^3(\sqrt{x}) \cos(\sqrt{x})}{\sqrt{x}}$$

2. (3 pts) Find the values of x at which the tangent line to the graph of $y = \frac{x^2-3}{x+2}$ is horizontal.

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

Find when $y' = 0$

$$\frac{x^2+4x+3}{(x+2)^2} = 0$$

$$x^2+4x+3 = 0$$

$$(x+3)(x+1) = 0$$

$$x = -3, -1$$