Math 10A
Worksheet, Discussion #6; Monday, 6/25/2018
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1 Derivatives and Tangents

1.1 Concepts

1. The point slope formula for a line with slope m going through the point (x_0, y_0) is

$$y - y_0 = m(x - x_0).$$

The derivative of $f^{-1}(x)$ at the point (x, y) is $\dfrac{1}{f'(y)}$.

1.2 Basic Derivatives

2. Find the tangent line to $-x^2$ at $x = 1$.
3. Find the derivative of $(\tan x)^2$.
4. Find the derivative of $\dfrac{x}{1 - \sin x}$.
5. Find the tangent line to x^3 at $x = -1$.
6. Find the derivative of $e^{\sin(2x)}$.

1.3 Inverse Derivatives

7. Let $f(x) = x^5 + 3x^3 + 7x + 2$. Find the tangent line to $f^{-1}(x)$ at $(13, 1)$.
8. Let $f(x) = e^{-2x} - 9x^3 + 4$. Find the tangent line to $f^{-1}(x)$ at $(5, 0)$.
9. Let $f(x) = x^7 + 2x + 9$. Find the tangent line to $f^{-1}(x)$ at $(12, 1)$.
10. Let $f(x) = x^{5/3}e^{x^2}$. Find the tangent line to $f^{-1}(x)$ at $(e, 1)$.
11. Let $f(x) = \dfrac{-e^{-3x}}{x^2 + 1}$. Find the tangent line to $f^{-1}(x)$ at $(-1, 0)$.

1.4 Implicit Derivatives

12. Find y' if $x^3 + y^3 = 4$.
13. Find y' if $e^{xy} = e^{4x} - e^{5y}$.
14. Find y' if $(x - y)^2 = x + y - 1$.
15. Find y' if $y = \sin(3x + 4y)$.
16. Find y' if $y = x^2y^3 + x^3y^2$.