Tangent Lines Assignment

Author	**Aaron Tresham**
Date	**2018-01-24T19:47:10**
Project	**a8975d68-235e-4f21-8635-2051d699f504**
Location	**04 - Tangent Lines Assignment/Tangent Lines Assignment.sagews**
Original file	**Tangent Lines Assignment.sagews**

Tangent Lines Assignment

Question 0

Watch the lecture video here.

Did you watch the video? [Type yes or no.]

Question 1

Consider the function $f(x) = 3x^2 - 2x + 1$.

Part a

Find the slope of the line tangent to f at the point $(1, 2)$ using limits.

Part b

Find an equation for this tangent line.

Part c

Graph f and its tangent line on the same axes with $0 < x < 2$.

Question 2

Consider the function $g(x) = e^{-x^2}$. [Caution: e is **not** a variable, so **do not** declare it.]

Part a

Find the slope of the line tangent to g at the point $(2, e^{-4})$ using limits.

Part b

Find an equation for this tangent line.

Part c

Graph g and its tangent line on the same axes with $1 < x < 3$.

Question 3

Consider the function $F(x) = \sin(3x) + \cos(2x)$.

Part a

Find the slope of the line tangent to F at the point $(0, 1)$ using limits.

Part b

Find an equation for this tangent line.

Part c

Graph F and its tangent line on the same axes with $-1 < x < 1$.

Question 4

Consider the function $G(x) = 2x^3 + 3x^2 - 36x + 30$.

Part a

Plot a graph of $G(x)$ with $-5 \leq x \leq 5$. Notice that $G(x)$ appears to have relative extrema at $x = -3$ and $x = 2$.

1

Part b

Confirm that $G(x)$ has horizontal tangent lines at $x = -3$ and $x = 2$ (i.e., calculate the slope of the tangent line, and see that it is 0).