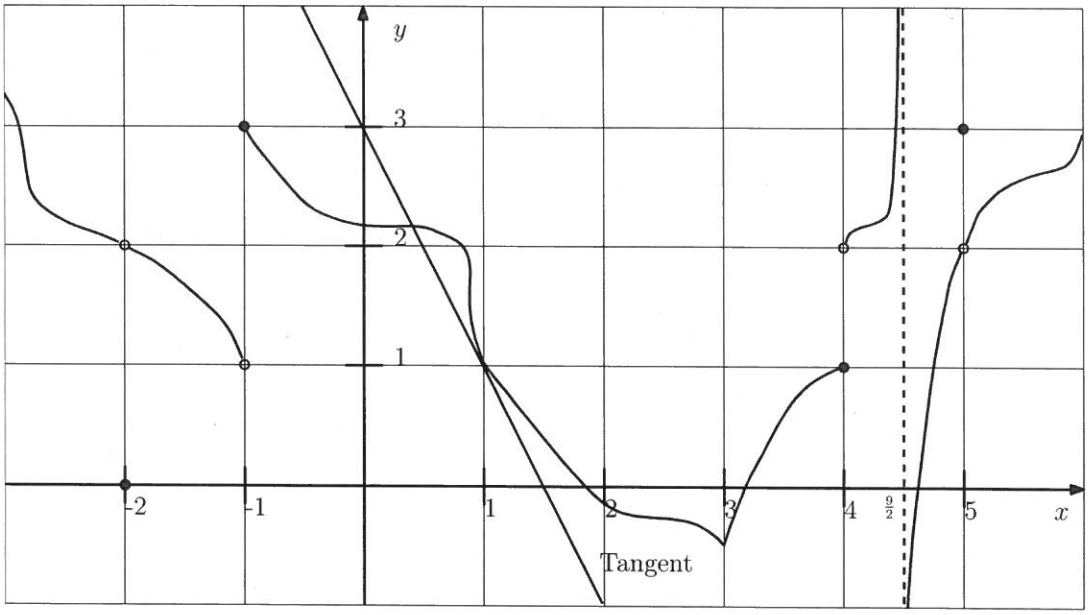
Math 1210: Quiz #4 **Fall 2017**

Name: solution	A#:	Section: H

[8] 1. Let f be a function whose graph of $y = f(x)$ is given below.



Fill in the following.

(a) List all x where f is not continuous: $-2, -1, 4, \frac{9}{2} = 4.5, 5$

(b) List all x where f is continuous, but not differentiable: $x = 3$

(c) List all x where f is right-continuous, but not continuous: $x = -1$

(d) $\lim_{x\to -2}(f(x)+1)^2 =$ $\left(\lim_{x\to -2} f(x)+1\right)^2 = (2+1)^2 = 9$

(e) $\lim_{x\to 0} f(e^x) =$ $f(e^0) = f(1) = 1$

(f) $f'(1) =$ -2

(g) If $g(x) = x^3 f(x)$, then $g'(1) =$ $3 \cdot 1 \cdot f(1) + 1 \cdot f'(1) = 3 - 2 = 1$ $\quad g'(x) = 3x^2 f(x) + x^3 f'(x)$

(h) If $h(x) = f(\frac{x}{2})$, then $h'(2) =$ $\frac{1}{2} f'(1) = -1$ $\quad h'(x) = \frac{1}{2} f'(x/2)$

v4.GH

[4] 2. Find the equation of the tangent line to $y = 3x^2 - 1$ at $x = 2$.

$f'(x) = 6x$

At $x=2$ we have the slope $f'(2) = 12$

$f(2) = 11$

The equation of the line is $y - 11 = 12(x-2)$

$y = 12x - 13$

[8] 3. Compute the derivative. **Do not simplify your answer.**

(a) $\frac{d}{dx}\left(\tan(x) + \frac{1}{x^2} + e^{2x} + \sin(4)\right)$

$= \sec^2 x - \frac{2}{x^3} + 2e^{2x} + 0$

$\frac{d}{dx}\left(\frac{1}{x^2}\right) = \frac{d}{dx}(x^{-2}) = -2x^{-3}$

$= \frac{-2}{x^3}$

$\frac{d}{dx}(e^{2x}) = e^{2x}(2x)' = 2e^{2x}$

(b) $\frac{d}{dt}\left(\frac{\cos(t)}{e^t + 1}\right) = \frac{-\sin(t)(e^t+1) - \cos(t)\,e^t}{(e^t+1)^2}$

$\frac{d}{dt}\frac{f(t)}{g(t)} = \frac{f'(t)\,g(t) - f(t)\,g'(t)}{g^2(t)}$

$(e^t+1)' = e^t$