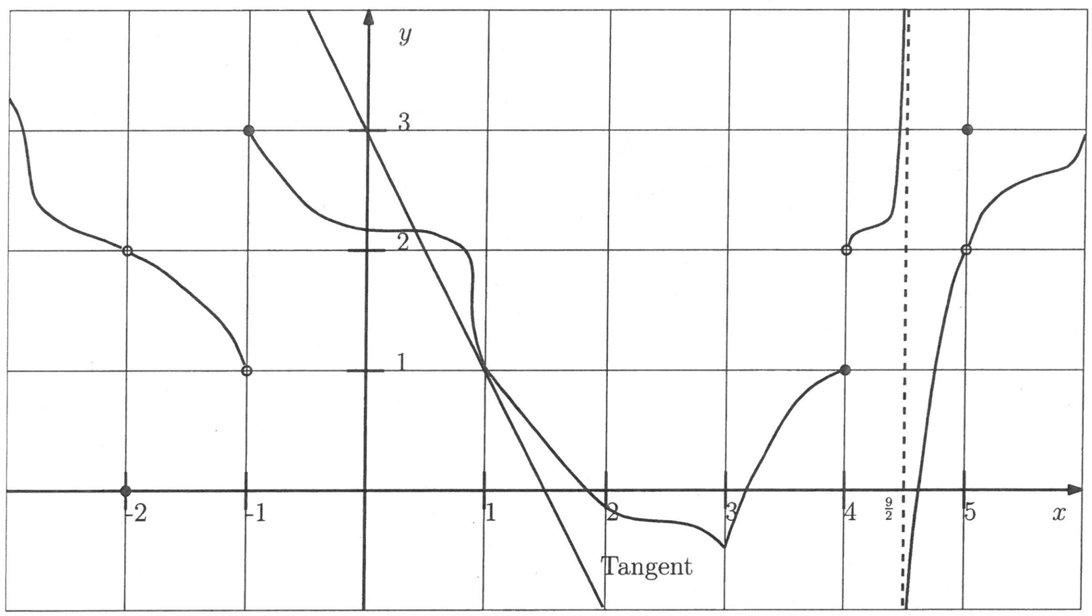
Math 1210: Quiz #4 **Fall 2017**

Name: Solutions	A#:	Section: G

[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: $x = -2, -1, 4, 9/2 = 4.5, 5$

(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) $\lim\limits_{x\to -2} (f(x)+1)^2 =$ $(2+1)^2 = 9$ $\lim\limits_{x\to -2} f(x) = 2$

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

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

$g'(x) = 3x^2 f(x) + x^3 f'(x)$

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

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

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

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

$y' = 6x$ so at $x=2$ we have slope $m = 12$

$x = 2 \Rightarrow y = 3(2)^2 - 1 = 11 \Rightarrow$ point $(2,11)$ on the line

Equation of line is: $y - 11 = 12(x-2)$

$y = 12x - 24 + 11$

$y = 12x - 13$

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

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

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

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

$\leftarrow \left(e^{2x}\right)' = e^{2x}(2x)' = e^{2x}(2)$

$= 2e^{2x}$

(b) $\dfrac{d}{dt}\left(\dfrac{\cos(t)}{e^t + 1}\right)$

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

$= \frac{-\sin(t)(e^t+1) - \cos(t)(e^t)}{(e^t+1)^2}$

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

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