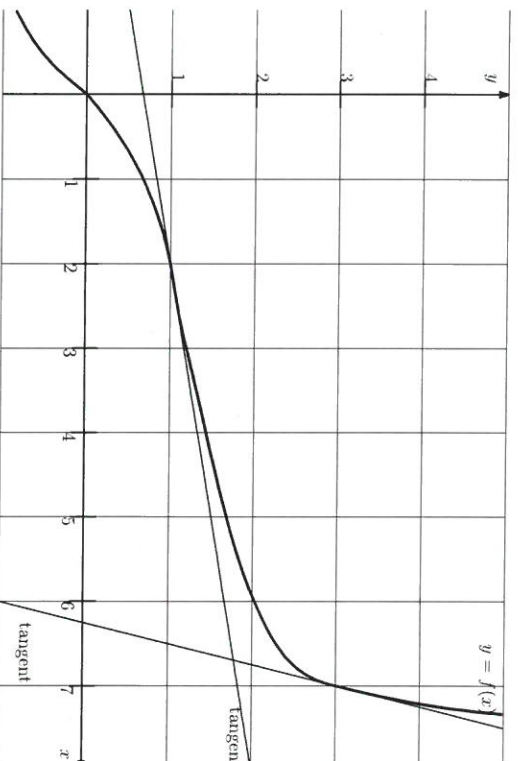


Math 1210: Quiz #5

Fall 2017

Name: <i>Mural (so/otms)</i>	A#:	Section:
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- [8] 1. Let f be a function whose graph of $y = f(x)$ is given below and let $g = f^{-1}$ be its inverse function.



Fill in the following.

- (a) $g(2) = \underline{6}$
- (b) $\lim_{h \rightarrow 0} \frac{f(2+h) - f(2)}{h} = \underline{f'(2) = 1/6}$
- (c) The instantaneous rate of change of $f(x)$ when $x = 7$ is $\underline{4}$
- (d) $g'(3) = \underline{1/4}$
- (e) If $h(x) = f(3x^2 + 1)$, then $h'(2) = \underline{f'(3(2)^2 + 1) \cdot 3(2)(2) = 12 f'(13)}$
- (f) If $k(x) = g(x) \ln(x)$, then $k'(3) = \underline{g'(3) \ln 3 + g(3)/3 = \frac{1}{4} \ln 3 + 7/3}$
- (g) If $F(x) = \tan^{-1}(f(x))$, then $F'(2) = \underline{[\frac{1}{1+f(2)^2}] f'(2) = \frac{1}{2} \cdot \frac{1}{6} = 1/12}$
- (h) Tangent line to the curve $y = 2f(x)$ at $x = 2$ is $\underline{y = \frac{1}{3}x + \frac{4}{3}}$

$m = 2f'(2) = 1/3$
 $y = \frac{1}{3}x + b$
 $2 = 2 - 2(\frac{1}{3}) = \frac{4}{3}$

[4] 2. Compute the derivative. Do not simplify.

$$3. \frac{d}{dt} (\sec(e^t) + \tan^{-1}(4) + \sin^{-1}(2t) + \ln(t^4 + 1))$$
$$= \sec(e^t) \tan(e^t) + \frac{1}{\sqrt{1-(2t)^2}} \cdot 2 + \frac{4t^3}{t^4+1}$$

[8] 4. Consider the curve given by $xy^2 = 5 + x^2 + y$. Find the equation of the tangent line given to the curve at the point $(3, -2)$.

~~Differentiate the curve implicitly~~ $\frac{d}{dx} (xy^2) = \frac{d}{dx} (5 + x^2 + y)$

$$\text{so } y^2 + 2xy \frac{dy}{dx} = 2x + \frac{dy}{dx}$$

$$\text{so at } (3, -2), \quad 4 - 12 \frac{dy}{dx} = 6 + \frac{dy}{dx} \quad \text{so } 13 \frac{dy}{dx} = -2 \quad \text{so } \frac{dy}{dx} = -\frac{2}{13}$$

$$\text{Hence the tangent line is } y - (-2) = -\frac{2}{13}x + 6 \quad \downarrow \quad \text{so } -2 + \frac{2}{13}(3) = -\frac{26}{13}$$

$$\text{So the tangent line is } \boxed{y = -\frac{2}{13}x - \frac{26}{13}}$$