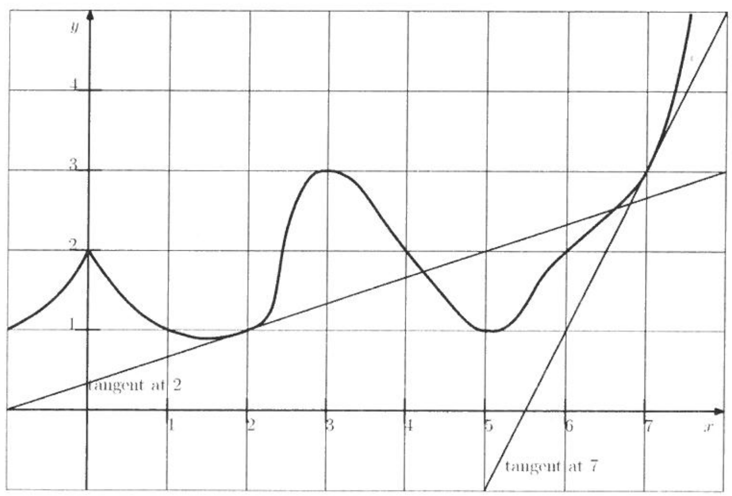
Math 1210: Quiz #8 **Fall 2017**

Name: SOLUTION	**A#:**	**Section:**

[7] 1. Let f be a function whose graph of $y = f(x)$ is given below. Let L_2 be the linearisation (linear approximation) of f centred at 2 and let L_7 be the linearisation of f centred at 7.



Fill in the following.

(a) For the following values of x we have $f'(x) = 0$: 3, 5

(b) The global maximum of [redacted] $f(x)$ on the interval $(4, 7]$ is: 3

(c) The global maximum of [redacted] $f(x)$ on the interval $(-1, 6)$ is: 3

(d) $L_2(x) =$ $1 + \frac{1}{3}(x-2)$

(e) The error in estimating $f(5) \approx L_7(5)$ is 2

(f) If dy is the differential of $y = f(3+x^2)$ centred at 2, then $dy(dx) =$ $8\,dx$

and $dy(-1) =$ -8

dx ↑ is the variable

$y' = 2x f'(3+x^2)$ $\boxed{\text{v8.AB}}$

$y'|_{x=2} = 2 \cdot 2 \cdot f'(7) = 8$

2. Let $f(x) = e^x$.

[6] (a) Find the linearisation (linear approximation) $L(x)$ of $f(x)$ centred at 0.

$f'(x) = e^x$, $f'(0) = 1$, $f(0) = 1$

$\boxed{L(x) = 1 + x}$

[2] (b) Use the linearisation above to estimate $e^{0.1}$.

$e^{0.1} \approx L(0.1) = 1.1$

[5] (c) Is $L(0.1)$ larger or smaller then $e^{0.1}$? Justify your answer.

$f''(x) = e^x$, this is positive on $[0, 0.1]$ so

$L(0.1) < e^{0.1}$.