

6. [10 points]

- a. [4 points] Below is a table of values for a differentiable function $g(x)$. Also shown are some values of $g'(x)$, which is an increasing function and also differentiable.

x	3	8	10
$g(x)$	10	1	0
$g'(x)$	-4	0.6	2

- i. [2 points] Write a formula for $L(x)$, the linear approximation of $g(x)$ at $x = 3$.

Answer: $L(x) =$ _____

- ii. [1 point] Use your formula for $L(x)$ to estimate $g(3.2)$.

Answer: $g(3.2) \approx$ _____

- iii. [1 point] Is your estimate of $g(3.2)$ an overestimate or an underestimate? Circle your answer.

Overestimate

Underestimate

Cannot be determined

- b. [2 points] The quadratic approximation of $g(x)$ at $x = 10$ is

$$Q(x) = 2(x - 10) + 2(x - 10)^2.$$

Find $g''(10)$.

Answer: $g''(10) =$ _____

- c. [4 points] Let $h(x) = (g(x))^3$. The linear approximation of $h(x)$ at $x = 6$ is

$$K(x) = 8 + 3(x - 6).$$

Find $g(6)$ and $g'(6)$.

Answer: $g(6) =$ _____

Answer: $g'(6) =$ _____