

1. [14 points] Let g be a twice differentiable function defined on $-1 < x < 11$. Some values of $g(x)$, $g'(x)$ and $g''(x)$ are shown in the table below.

x	0	2	4	6	8	10
$g(x)$	-2	-1	3	4	5	6
$g'(x)$	0.5	2	?	5	1	2
$g''(x)$	2	1	5	-3	-1	0.5

- a. [7 points] Find the *exact* value of the following expressions. If there is not enough information to compute the value, write “NI”. Show all your work.

i) Let $h(x) = 2^{g(x)}$. Find $h'(6)$.

$$h'(6) = \underline{\hspace{4cm}}$$

ii) Let $k(x) = g(x)g'(x)$. Find the value of $g'(4)$ if $k'(4) = 15$.

$$g'(4) = \underline{\hspace{4cm}}$$

iii) Let $r(x) = \frac{\sin(x)}{g(x)}$. Find $r'(0)$.

$$r'(0) = \underline{\hspace{4cm}}$$

- b. [7 points] Let $j(x) = g(14 - 4x)$.

i) Use the values from the table to find a formula for $L(x)$, the linear approximation to $j(x)$ at $x = 2$.

$$L(x) = \underline{\hspace{4cm}}$$

ii) Find an approximate value for $j(2.25)$ using your formula for $L(x)$.

$$j(2.25) \approx \underline{\hspace{4cm}}$$

iii) Is your value an overestimate or underestimate of the exact value of $j(2.25)$? Circle your answer.

OVERESTIMATE

UNDERESTIMATE

NOT ENOUGH INFORMATION