

1. [15 points] Given below is a table of values for a function $T(h)$ and its derivative $T'(h)$. Suppose the functions $T(h)$, $T'(h)$, and $T''(h)$ are all defined and continuous on $(-\infty, \infty)$.

h	-4	-2	0	2	4	6	8
$T(h)$	-1	3	5	6	2	1	0
$T'(h)$	3	2	1	0	-1	0	-2

Assume that between consecutive values of h given in the table above, $T(h)$ is either **always increasing** or **always decreasing**.

In **a.–c.**, give numerical answers. *You do not need to show work on this page, but limited partial credit may be awarded for work shown.*

- a. [2 points] Find the average rate of change of $T(h)$ on the interval $[-4, 4]$.

Answer: _____

- b. [2 points] Use the table to estimate $T''(7)$.

Answer: _____

- c. [3 points] Find $\int_0^6 (2T'(h) + 3) dh$.

Answer: _____

- d. [2 points] Find an equation of the tangent line to the graph of $T(h)$ at $h = -4$.

Answer: _____

This problem continues from the previous page. The problem statement is repeated for convenience.

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Assume that between consecutive values of h given in the table above, $T(h)$ is either **always increasing** or **always decreasing**.

- e. [2 points] Use a right-hand Riemann sum with three equal subdivisions to estimate $\int_{-4}^2 T(h) dh$. Write out all the terms in your sum, which you do not need to simplify.

- f. [1 point] Does the answer to part e. overestimate, underestimate, or equal the value of $\int_{-4}^2 T(h) dh$? Circle your answer. If there is not enough information, circle NEI.

Answer: OVERESTIMATE UNDERESTIMATE EQUAL NEI

- g. [1 point] How many equal subdivisions of $[-4, 2]$ are needed to guarantee that the difference between the left and right Riemann sum approximations of $\int_{-4}^2 T(h) dh$ is at most 1?

Answer: _____

- h. [2 points] Find a number L that makes the following statement a correct conclusion of the Mean Value Theorem: *There is a number c between -2 and 4 such that $T'(c) = L$.*

Answer: $L =$ _____