2. [10 points] Lucy Lemon, the owner of a local lemonade stand, has observed that her lemonade sales are highly dependent on the temperature. Let $L(T)$ denote the number of cups of lemonade Lucy sells on a day whose average temperature is $T°$ Fahrenheit. Below is a table of values for the **derivative**, $L'(T)$. Assume that between each pair of consecutive T-values in the table, L' is either strictly increasing or strictly decreasing.

T	50	55	60	65	70	75	80	85	90
$L'(T)$	-5	-4	-2	2	5	6	3	-2	-3

a. [4 points] Approximate the values of T at which $L(T)$ has a critical point, and classify each as a local maximum, local minimum, or neither. (No explanation is necessary.)

Solution: The sign of the derivative goes from negative to positive at approximately $T = 62.5$, so by the first-derivative test, there is a local minimum at approximately that point. (Any T-value between 60 and 65 is an acceptable answer.) The sign of the derivative goes from positive to negative at approximately $T = 82.5$, so there is a local maximum at approximately that point. (Any T-value between 80 and 85 is an acceptable answer.)

b. [6 points] Suppose on a day when the temperature is $T°$ Fahrenheit, Lucy sells $R(T)$ dollars worth of lemonade. Assuming cups of lemonade sell for \$1.50 each, compute $R'(80)$, and write a sentence expressing the meaning of $R'(80)$ which would be understood by someone who knows no calculus.

Solution: The function $R(T)$ is given by the formula $R(T) = 1.5L(T)$, so

$$R'(80) = 1.5L'(80) = 4.5.$$

In practical terms, this means that Lucy earns about \$4.50 more on a day whose average temperature is 81°F than she does on a day whose average temperature is 80°F.