

## BC Calculus – Calculator Active Free Response Practice 1

Name \_\_\_\_\_ Pd \_\_\_\_\_

Distance, $x$ (cm)	0	1	5	6	8
Temperature, $T(x)$ ( $^{\circ}\text{C}$ )	100	93	70	62	55

A metal wire of length 8 centimeters (cm) is heated at one end. The table above gives selected values of the temperature  $T(x)$ , in degrees Celsius ( $^{\circ}\text{C}$ ), of the wire  $x$  cm from the heated end. The function  $T$  is decreasing and twice differentiable.

- Estimate  $T'(7)$ . Show the work that leads to your answer. Indicate units of measure.
- Write an integral expression in terms of  $T(x)$  for the average temperature of the wire. Estimate the average temperature of the wire using a trapezoidal sum with the four subintervals indicated by the data in the table. Indicate units of measure.
- Find  $\int_0^8 T'(x) dx$ , and indicate units of measure. Explain the meaning of  $\int_0^8 T'(x) dx$  in terms of the temperature of the wire.
- Are the data in the table consistent with the assertion that  $T''(x) > 0$  for every  $x$  in the interval  $0 < x < 8$ ? Explain your answer.