

MTHSC 102 SECTION 4.1 – APPROXIMATING CHANGE

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NOTE

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FACT

When the input x changes by a small amount h to $x + h$, the output $f(x + h)$ can be approximated by

$$f(x + h) \approx f(x) + f'(x) \cdot h.$$

EXAMPLE

The temperature for a 2 hour period during and after a thunderstorm can be modeled by

$$T(h) = 2.37h^4 - 5.163h^3 + 8.69h^2 - 9.87h + 78 \text{ }^{\circ}\text{F},$$

where h is the number of hours since the storm began.

- 1 Use the rate of change of $T(h)$ to at $h = 0.25$ to estimate by how much the temperature changed between 15 and 20 minutes after the storm began.

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- 2 Find the temperature and rate of change of temperature at $h = 1.5$ hours.
- 3 Using only the answers to the last question, estimate the temperature 1 hour and 40 minutes after the storm began.

DEFINITION

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Suppose that a manufacturer of toasters currently produces 220 toasters per day with a total production cost of \$ 11,000 and a marginal cost of \$ 20 per toaster.

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- 1 What information does the marginal cost value give the manufacturer?
- 2 If $C(x)$ is the cost to produce x toasters, what is the notation for marginal cost?

NOTE

Note that we have the relationship

$$\text{marginal profit} = \text{marginal revenue} - \text{marginal cost}.$$