MTHSC 102 Section 3.1 – Drawing Rate of Change Graphs

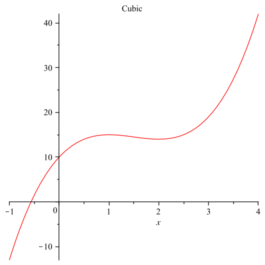
Kevin James

Definition

Suppose that $y = f(x)$ is a smooth continuous curve. The graph of $y = f'(x)$ is called the slope graph for this curve.

Example

The graph



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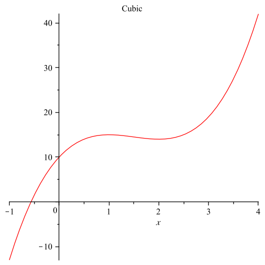

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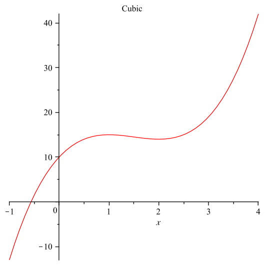

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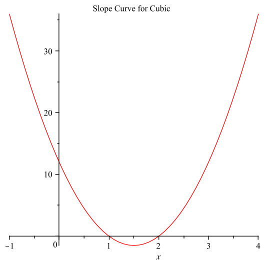
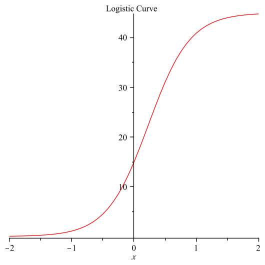


Example

Consider the logistic curve.



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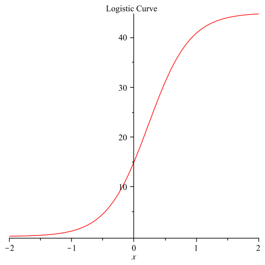

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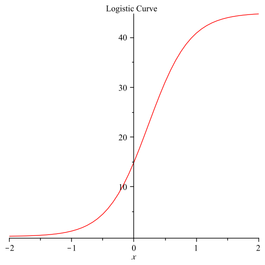

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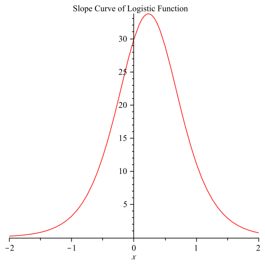

Example

1. Sketch a graph which is always increasing and whose slopes are always increasing.
2. Sketch a graph which is always increasing and whose slopes are always decreasing.
3. Sketch the slope graphs of these functions.

Sketching Slope Graphs

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3. Points of inflection. These are locations of local extrema of the derivative.
4. Places where the graph is horizontal or appears to be leveling off. These will be places where the derivative is approaching zero.

Note

Given a graph we can draw a few tangent lines and estimate the slopes in order to plot some points on the graph of the derivative graph. That is, if the slope of the line tangent to $y = f(x)$ at a is m then $f'(a) = m$. Thus, the point (a, m) is on the graph of $f'(x)$.

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4. The graph of $f(x)$ is continuous and smooth and has a vertical tangent line at $(a, f(a))$.