

Section 4.4: Graphing with Calculus and Computers

These notes reflect material from our text, *Calculus, Concepts and Contexts, Third Edition*, by James Stewart, published by Brooks/Cole, Pacific Grove, CA, 2005.

Key points from Stewart, Section 4.4: Graphing with Calculus and Computers.

Concepts

Using a computer algebra system to identify all of the important elements in the graph of a function f , and then using the calculus to specify those elements exactly

(1) based on f

- (1.a) specific points on the graph, such as the y -intercept $P(0, f(0))$
- (1.b) horizontal and vertical asymptotes

(2) based on f'

- (2.a) intervals of increase and decrease
- (2.b) all local and global maxima and minima

(3) based on f''

- (3.a) intervals of concavity
- (3.b) points of inflexion

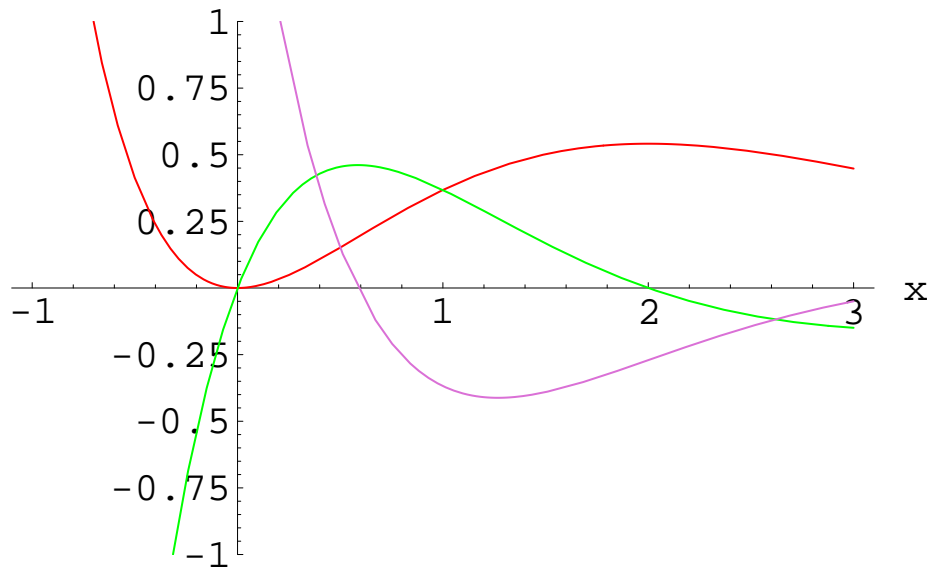


Fig. Greatest rate of increase of $f \Rightarrow$ maximum of $f' \Rightarrow$ zero of f'' .

Exercises

Exercises for Section 4.4, pp 295–296: 6, 9, 11 (asymptotes and intercepts), 15 (CAS), 20 (parametric curve)