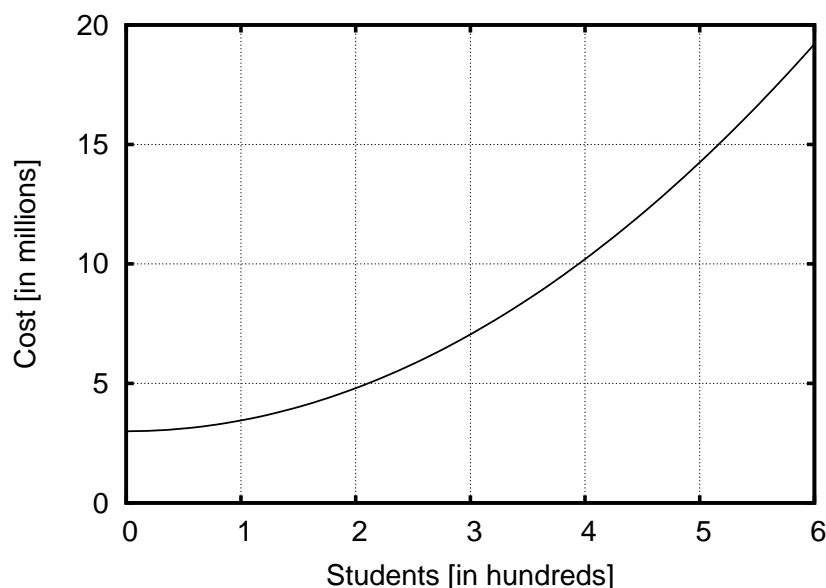


Chapter 4.3: Optimization

Calculus I

College of the Atlantic. Fall 2014

- Let $g(x) = x^2 - 6x + 11$.
 - What is the global minimum and maximum of $g(x)$ on the interval $[1, 4]$?
 - What is the global minimum and maximum of $g(x)$ on the interval $[3, 4]$?
- Consider $f(x) = xe^{-x^4}$, where x is always greater or equal to zero. What is the maximum value of $f(x)$? What is the minimum value?
- Sketch a continuous function that has local minima at 2 and 4, a global maximum at 3, and no other extrema.
- Sketch a continuous function that has no critical points but has an inflection point at $x = -2$.
- In the figure is shown a plot of the cost of running a school as a function of the number of students. What number of students leads to the lowest average cost per student?



- A grapefruit is tossed straight up with an initial velocity of 50 ft/s. The grapefruit is 5 feet above the ground when it is released. Its height at time t is given by

$$h(t) = -16t^2 + 50t + 5. \quad (1)$$

- How high does it go before returning to the ground?
- How long does it take the grapefruit to reach its maximum height?