MA 160 Dr. Katiraie Cost and Area
Section 5.1

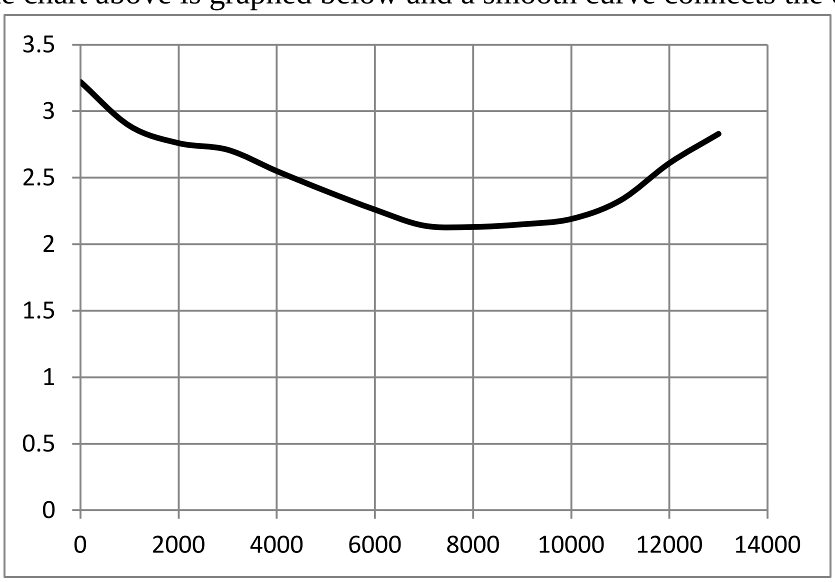
I. Estimating Cost from Marginal Cost

1. The table below shows the marginal cost for a company's product at various production levels.

Units	Marginal Cost ($/unit)	Units	Marginal Cost ($/unit)
0	3.22	7000	2.14
1000	2.89	8000	2.13
2000	2.76	9000	2.15
3000	2.71	10,000	2.19
4000	2.55	11,000	2.33
5000	2.40	12,000	2.61
6000	2.26	13,000	2.83

We are going to estimate the cost (not including fixed costs) to produce the first 12,000 batches of 2000 units using the initial marginal cost for each batch.

2. The data in the chart above is graphed below and a smooth curve connects the data points.

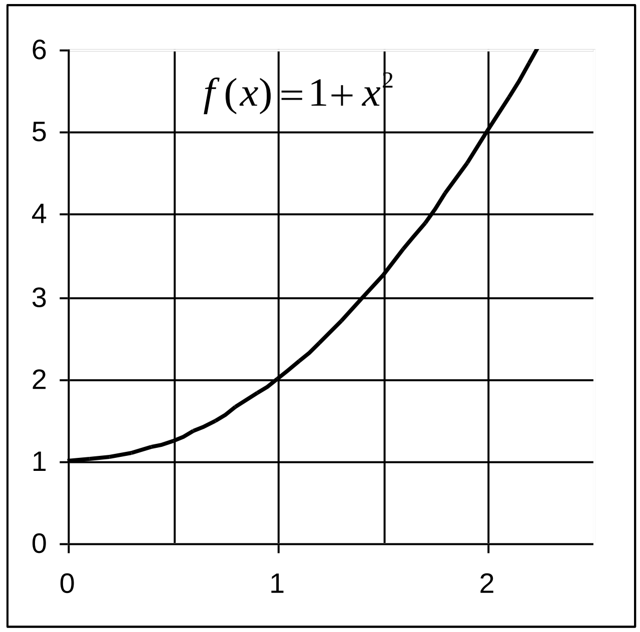


We will use this graph to visualize the cost calculations made in #1 above.

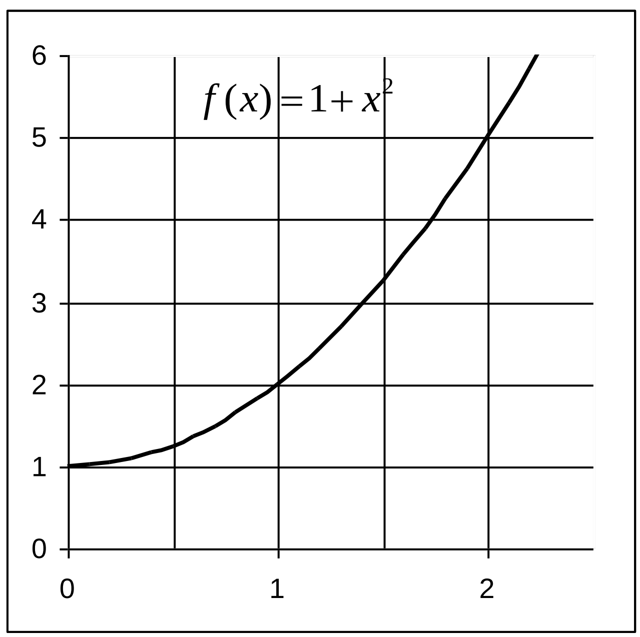
II. **Estimating the Area under a Curve**

3.

(a) Use 4 approximating rectangles and left endpoints to estimate the area under the graph of $f(x) = 1 + x^2$ on the interval [0, 2].



(b) Use 8 approximating rectangles and left endpoints to estimate the area under the graph of $f(x) = 1 + x^2$ on the interval [0, 2].



(c) Later on in this chapter, you will learn how to determine the exact value of the area under the graph of $f(x)=1+x^2$ on the interval [0, 2]. It is 14/3 or about 4.67. Which of the estimates in (a) and (b) is the better estimate? Why do you think this is the case?

Why do you think the estimates in (a) and (b) are less than the actual value of the area?

(d) Estimates can also be calculated using approximating rectangles and right endpoints or midpoints. If we used right endpoints for the graph above, how do you think the estimate would compare to the actual value of the area?

(e) We usually get a better approximation using midpoints instead of left or right endpoints. To see this, use 4 approximating rectangles and midpoints to estimate the area under the graph of $f(x)=1+x^2$ on the interval [0, 2]. How does this estimate compare to the actual value?