Solutions for Calculus Vol 1: One variable calculus, with an introduction to Linear Algebra (2nd Edition) by Tom M. Apostol

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Contents

0.1 Introduction

0.1.1 1.4 Exercises

1

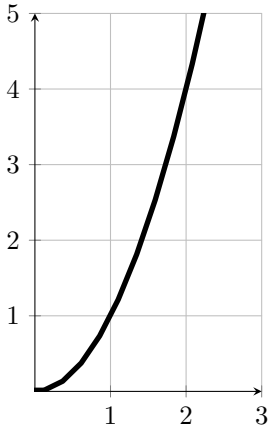
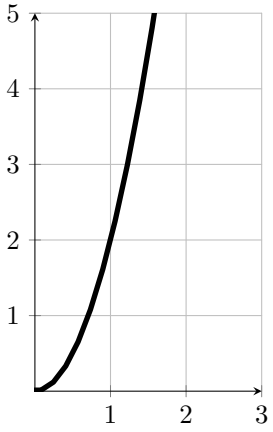


Figure 1.3: $y = x^2$

a) Modify the region in Figure 1.3 by assuming that the ordinate at each x is $2x^2$ instead of x^2.

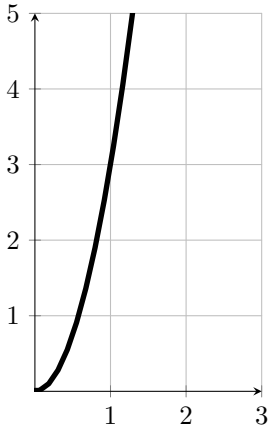
Draw the new figure.



$y = 2x^2$

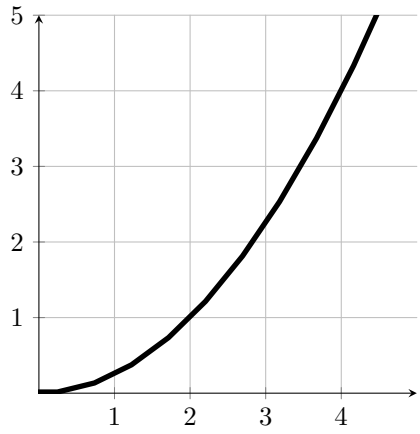
Check through the principal steps in the forgoing section and find what effect this has on the calculation of the area. Do the same if the ordfinate at each x

b) $3x^2$



$y = 3x^2$

c) $\frac{1}{4}x^2$



$y = \frac{1}{4}x^2$

d) $2x^2 + 1$
e) $ax^2 + c$

2

Modify the region in Figure 1.3 by assuming that the ordinate at each x is x^3 instead of x^2.

Draw the new figure.

a) Use a construction similar to that illustrated in Figure 1.5 and show that the outer and inner sums S_n and s_n are given by

$$S_n = \frac{b^4}{n^4}(1^3 + 2^3 + ... + n^3),\ s_n = \frac{b^4}{n^4}[1^3 + 2^3 + ... + (n-1)^3]$$

b)