

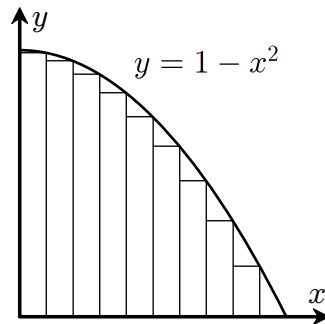
Homework 11

1. The following chart shows the speed of a moving object over a period of 30 seconds.

| | | | | | | | |
|-------------|-----|-----|-----|-----|-----|-----|-----|
| Time (s) | 0 | 5 | 10 | 15 | 20 | 25 | 30 |
| Speed (m/s) | 1.2 | 2.0 | 2.8 | 3.4 | 4.0 | 4.4 | 4.8 |

- (a) Estimate the average speed of the object during the first five seconds.
- (b) Estimate the distance traveled by the object over the first five seconds.
- (c) Use your method from parts (a) and (b) to estimate the distance traveled by the object over each five-second interval.
- (d) Based on your answer to part (c), what was the total distance traveled by the object over the 30-second period?

2. The goal of this problem is to estimate the value of $\int_0^1 (1 - x^2) dx$. The following picture shows nine rectangles drawn under the graph of $y = 1 - x^2$.

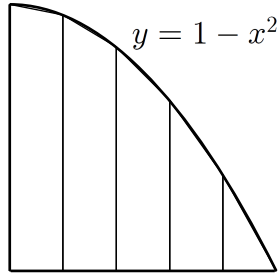


Each rectangle has width 0.1.

- (a) Make a table showing the rightmost x -coordinate, height, and area of each rectangle.

- (b) Find the total area of the nine rectangles.

Though rectangles are simpler, in practice it works better to use trapezoids and triangles. The following picture shows four trapezoids and one triangle drawn under the graph of $y = 1 - x^2$.



Each of these shapes has a width of 0.2. As you can see, these five shapes almost completely fill the area under the parabola.

(c) Find the area of each of the five shapes. (You may want to look up the formula for the area of a trapezoid.)

(d) Determine the total area of the five shapes.