

1. Evaluate the following sums.

a.
$$\sum_{i=1}^4 \frac{i^3}{i^2+7}$$

b.
$$\sum_{i=6}^{10} (7-i)$$

c.
$$\sum_{i=1}^{1000} 3i$$

d.
$$\sum_{i=1}^{500} 7$$

e.
$$\sum_{i=126}^{500} 7$$

f.
$$\sum_{i=1}^{300} (5+i)^2$$

g.
$$\sum_{i=7}^{2000} \left[\frac{1}{i+1} - \frac{1}{i} \right]$$

2. a. Sketch the graph of $y = x^3$ on the interval $[0, 3]$.
- b. Estimate the *area* of the region below the graph of $y = x^3$ and above $[0, 3]$ using rectangles above three equal subdivisions and
- left endpoints
 - right endpoints
 - midpoints
- c. Which of your estimates in part b. do you think is best ?
3. a. Sketch the graph of $y = 1/x$ on the interval $[1, 6]$.
- b. Estimate the *area* of the region below the graph of $y = 1/x$ and above $[1, 6]$ using rectangles above five equal subdivisions and
- left endpoints
 - right endpoints
 - midpoints
- c. Which of your estimates in part b. do you think is best ?

4. Estimate the *area* of the region below the graph of $y = 1/x$ and above $[1, 6]$ using rectangles at the midpoints of the subdivisions determined by the partition (points) $x_0 = 1$, $x_1 = 3$, $x_2 = 3.5$, $x_3 = 4$, $x_4 = 5$, $x_5 = 5.2$, and $x_6 = 6$.

5. Estimate the *volume* of a right circular cone with a 6 cm. base radius and 12 cm. height by dividing the height interval into four equal sections and using cylinders determined by midpoints.

6. An airplane travels at a speed of t^3 miles per minute, where t is the elapsed time (minutes) after take-off. Estimate the *total distance* traveled by the plane during the first three minutes of flight by using the midpoints of three equal subdivisions of time .

7. The density at a point along a thin rod two feet long is given by $x^2 + 1$ (gm./ft.), where x is the distance from the point to the left end of the rod. Use four equal subdivisions and midpoints to estimate the *total mass* of the rod.