Area and the Definite Integral P-Set

Using the left endpoints, approximate the area under each curve above the x-axis using

(a) 4 rectangles and

(b) 8 rectangles

1. $f(x) = x^2 + 2$ from $x = 0$ to 4

2. $f(x) = x^3$ from $x = 0$ to 4

3. $f(x) = \dfrac{1}{x}$ from $x = 1$ to 5

Using the right endpoints, approximate the area under each curve above the x-axis using

(a) 4 rectangles and

(b) 8 rectangles

4. $f(x) = x^2 + 2$ from $x = 0$ to 4

5. $f(x) = x^3$ from $x = 0$ to 4

6. $f(x) = \dfrac{1}{x}$ from $x = 1$ to 5

Use a graphing utility to find the area under the curve for each given interval.

7. $\displaystyle\int_0^4 \left(x^2 + 2\right) \, dx$

8. $\displaystyle\int_0^4 x^3 \, dx$

9. $\displaystyle\int_1^5 \frac{1}{x} \, dx$

Provide a sketch of the area under the curve for each. Then use a graphing utility to approximate the area.

10. $\displaystyle\int_1^6 \left(x^3 + 1\right) dx$

11. $\displaystyle\int_0^9 \sqrt{x} \, dx$

12. $\displaystyle\int_{-2}^5 |x| \, dx$

Area and the Definite Integral KEY

1. (a) 22   (b) $\dfrac{51}{2}$

2. (a) 36   (b) 49

3. (a) $\dfrac{25}{12}$ (b) $\dfrac{4609}{2520}$

4. (a) 38   (b) 33.5

5. (a) 100   (b) 81

6. (a) $\dfrac{77}{60}$ (b) $\dfrac{3601}{2520}$

7. $\dfrac{88}{3} = 29.\overline{3}$

8. 64

9. about 1.6094

10. 328.75

11. 18

12. 14.5