

§ 5.1 # 22, 39, 41, 43

22.  $f(x) = \sqrt{4-x^2}$  on  $[-2, 2]$ ; width = 1

left endpoints:  $-2, -1, 0, 1$ ; right endpoints  $-1, 0, 1, 2$ ;

$$\begin{aligned} L_4 &= f(-2) + f(-1) + f(0) + f(1) = \sqrt{4-(-2)^2} + \sqrt{4-(-1)^2} + \sqrt{4} + \sqrt{4-(1)^2} \\ &= 0 + \sqrt{3} + \sqrt{4} + \sqrt{3} \approx 5.464102... \end{aligned}$$

$$\begin{aligned} R_4 &= f(-1) + f(0) + f(1) + f(2) = \sqrt{4-(-1)^2} + \sqrt{4} + \sqrt{4-(1)^2} + \sqrt{4-(2)^2} \\ &= \sqrt{3} + \sqrt{4} + \sqrt{3} + \sqrt{0} \approx 5.46410... \end{aligned}$$

39. net change in Sea level =  $0.3 + 1.5 + 0.2 + 2.8 + 0.7 + 1.1 + 1.5 = 8.1$

41. estimated % change in pop =  $1.12 + 0.99 + 0.93 + 0.86 + 0.93 + 0.93 + 0.97 + 0.96 + 0.95 + 0.88 = 9.5$

$$\begin{aligned} 43. L_8 &= f(0) + f(1) + f(2) + f(3) + f(4) + f(5) + f(6) + f(7) \\ &= 3 + 2 + 1 + 2 + 3 + 4 + 5 + 4 \\ &= 24 \end{aligned}$$