

Math HW 4.1A

2. a. i. Left endpoints: $x=0, 2, 4, 6, 8, 10$

$$A = 2 \cdot [9 + 8.75 + 8.15 + 7.25 + 6 + 4]$$

$$= 86.3$$

ii. Right endpoints: $x=2, 4, 6, 8, 10, 12$

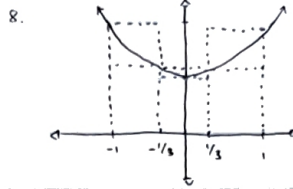
$$A = 2 \cdot [8.75 + 8.15 + 7.25 + 6 + 4]$$

$$= 70.3$$

iii. Midpoints: $x=1, 3, 5, 7, 9, 11$

$$A = 2 \cdot [8.95 + 8.5 + 7.8 + 6.7 + 5 + 2.8]$$

$$= 79.5$$



~~Handwritten scribbles~~

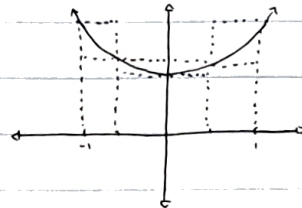
~~Handwritten scribbles~~

$$U_3 = (2 + 1.1 + 2) \cdot \frac{2}{3}$$

$$= 3.4$$

$$L_3 = (1.1 + 1 + 1.1) \cdot \frac{2}{3}$$

$$= 2.13$$



$$U_4 = \frac{1}{2} (2 + 1.25 + 1.25 + 2)$$

$$= 3.25$$

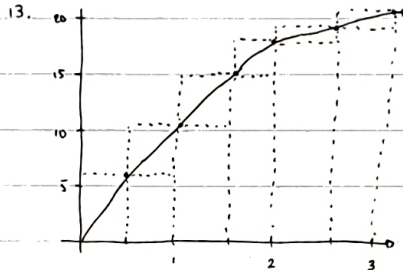
$$L_4 = (1.25 + 1 + 1 + 1.25)$$

$$= 2.25$$

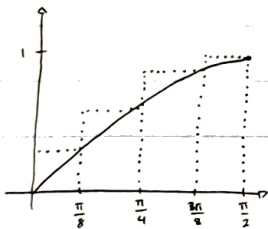
b. Overestimate

c. Underestimate

d. M_6 gives the best estimate as it is inbetween the overestimate and underestimate. Therefore it would be more accurate than L_6 and R_6



4. a.



$$L = \frac{1}{2} (6.2 + 10.8 + 14.9 + 18.1 + 19.4)$$

$$= 34.7$$

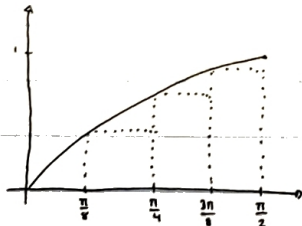
$$U = \frac{1}{2} (6.2 + 10.8 + 14.9 + 18.1 + 19.4 + 20.2)$$

$$= 44.8$$

$$A = \frac{\pi}{8} \cdot \left[\sin\left(\frac{\pi}{8}\right) + \frac{\sqrt{2}}{2} + \sin\left(\frac{3\pi}{8}\right) + 1 \right]$$

$$= 1.183$$

b.



$$A = \frac{\pi}{8} \cdot \left[\sin\left(\frac{\pi}{8}\right) + \frac{\sqrt{2}}{2} + \sin\left(\frac{3\pi}{8}\right) \right]$$

$$= 0.9907$$