

Homework 22

$$b) f(t) = \frac{t^2-1}{\sqrt{t}} = \frac{t^2}{\sqrt{t}} - \frac{1}{\sqrt{t}} = \frac{t^2}{t^{\frac{1}{2}}} - \frac{1}{t^{\frac{1}{2}}} = t^{\frac{3}{2}} - t^{-\frac{1}{2}}$$

$$F(t) = \frac{2}{5} t^{\frac{5}{2}} - 2t^{\frac{1}{2}} + C$$

$$10) f''(x) = -\cos(x) + \sin(x) \quad f(0) = 1 \quad f(\pi) = 0$$

$$f'(x) = -\sin(x) - \cos(x) + C_1$$

$$f(x) = \cos(x) - \sin(x) + C_1 x + C_2$$

$$1 = \cos(0) - \sin(0) + C_1 \cdot 0 + C_2$$

$$1 = 1 - 0 + 0 + C_2$$

$$1 = 1 + C_2$$

$$C_2 = 0$$

$$0 = \cos(\pi) - \sin(\pi) + C_1 \cdot \pi + 0$$

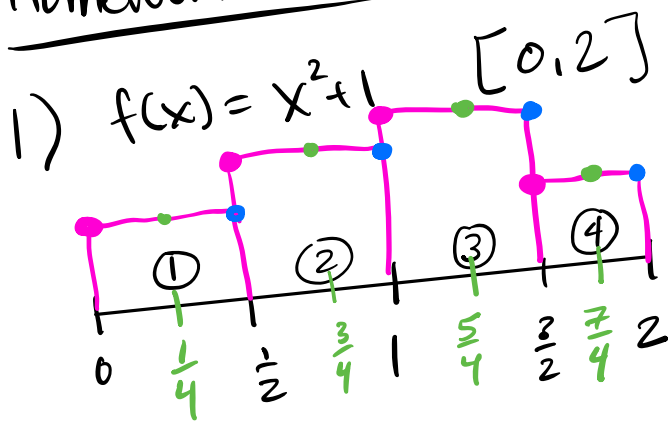
$$0 = -1 - 0 + C_1 \pi$$

$$C_1 \pi = 1$$

$$C_1 = \frac{1}{\pi}$$

$$f(x) = \cos(x) - \sin(x) + \frac{1}{\pi} x$$

Homework 23



$$n = 4$$

$$\sum_{i=1}^n f(x_i) \Delta x$$

left:

$$f(0) = 1$$

$$f\left(\frac{1}{2}\right) = \frac{5}{4}$$

$$f(1) = 2$$

$$f\left(\frac{3}{2}\right) = \frac{13}{4}$$

$$\frac{1}{2} \left[1 + \frac{5}{4} + 2 + \frac{13}{4} \right]$$

$$= \frac{1}{2} \left[\frac{4 + 5 + 8 + 13}{4} \right]$$

$$= \frac{30}{8} = \frac{15}{4}$$

mid:

$$f\left(\frac{1}{4}\right) = \frac{17}{16}$$

$$f\left(\frac{3}{4}\right) = \frac{25}{16}$$

$$f\left(\frac{5}{4}\right) = \frac{41}{16}$$

$$f\left(\frac{7}{4}\right) = \frac{65}{16}$$

$$\frac{1}{2} \left[\frac{17}{16} + \frac{25}{16} + \frac{41}{16} + \frac{65}{16} \right]$$

$$= \frac{148}{32} = \frac{37}{8}$$

right:

$$f\left(\frac{1}{2}\right) = \frac{5}{4}$$

$$f(1) = 2$$

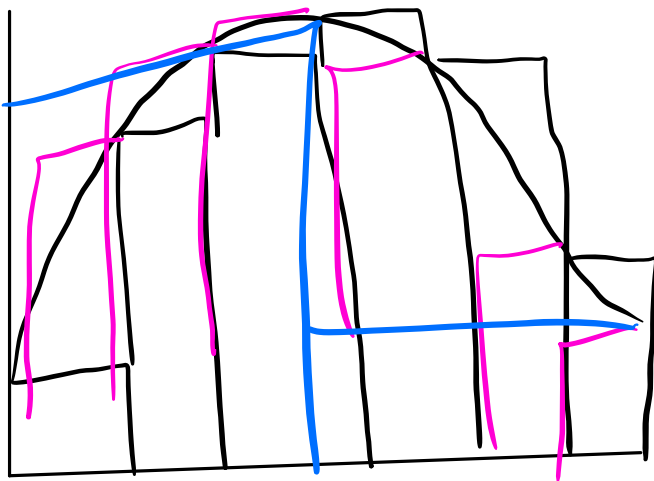
$$f\left(\frac{3}{2}\right) = \frac{13}{4}$$

$$f(2) = 5$$

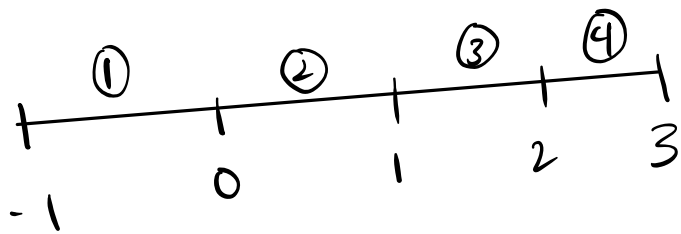
$$\frac{1}{2} \left[\frac{5}{4} + 2 + \frac{13}{4} + 5 \right]$$

$$= \frac{1}{2} \left[\frac{5 + 8 + 13 + 20}{4} \right]$$

$$= \frac{46}{8} = \frac{23}{4}$$



$$2) f(x) = 2x + 3 \quad [-1, 3] \quad n = 4$$



left:

$$f(-1) = 1$$

$$f(0) = 3$$

$$f(1) = 5$$

$$f(2) = 7$$

$$1[1 + 3 + 5 + 7] = 16$$

mid:

$$f(-\frac{1}{2}) = 2$$

$$f(\frac{1}{2}) = 4$$

$$f(\frac{3}{2}) = 6$$

$$f(\frac{5}{2}) = 8$$

$$1[2 + 4 + 6 + 8] = 20$$

right:

$$f(0) = 3$$

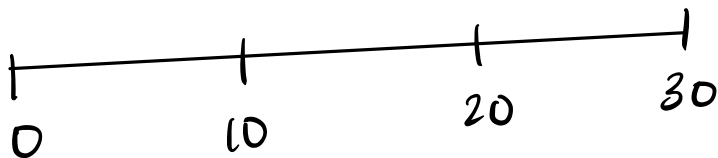
$$f(1) = 5$$

$$f(2) = 7$$

$$f(3) = 9$$

$$1[3 + 5 + 7 + 9] = 24$$

$$3) f(x) = x^2 + 2x \quad [0, 30] \quad n = 3$$



$$\Delta x = 10$$

left:

$$f(0)$$

$$f(10)$$

$$f(20)$$

mid:

$$f(5)$$

$$f(15)$$

$$f(25)$$

right:

$$f(10)$$

$$f(20)$$

$$f(30)$$