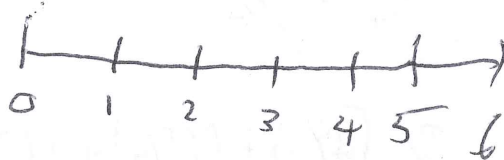


BQ HW | a) Left b) Right c) Upper d) Lower e) Trap. f) Midpt.

$$1) f(x) = \frac{1}{2}x^3 - 2x^2 + 6 \quad [0, 6] \quad 6 \text{ subintervals}$$

$$\text{width} = \frac{b-a}{n} = \frac{6-0}{6} = 1$$



$$\begin{aligned} f(0) &= 6 \\ f(1) &= 4.5 \\ f(2) &= 2 \\ f(3) &= 1.5 \\ f(4) &= 6 \\ f(5) &= 18.5 \\ f(6) &= 42 \end{aligned}$$

$$\text{Left: } 1 [f(0) + f(1) + f(2) + f(3) + f(4) + f(5)]$$

$$\text{Right: } 1 [f(1) + f(2) + f(3) + f(4) + f(5) + f(6)]$$

$$\text{c) Upper: } 1 [f(0) + f(1) + f(2) + f(4) + f(5) + f(6)]$$

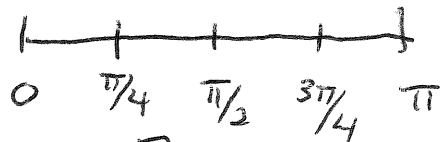
$$\text{d) Lower: } 1 [f(1) + f(2) + f(3) + f(3) + f(4) + f(5)]$$

$$\text{e) Trapezoid: } \frac{1}{2} [f(0) + 2f(1) + 2f(2) + 2f(3) + 2f(4) + 2f(5) + f(6)]$$

$$\text{f) Midpt: } 1 [f(0.5) + f(1.5) + f(2.5) + f(3.5) + f(4.5) + f(5.5)]$$

2) $g(x) = \sin\sqrt{x}$ on $[0, \pi]$ 4 subintervals

$$\text{width} = \frac{\pi - 0}{4} = \frac{\pi}{4}$$



a) Left $\frac{\pi}{4} [f(0) + f(\pi/4) + f(\pi/2) + f(3\pi/4)]$

b) Right $\frac{\pi}{4} [f(\pi/4) + f(\pi/2) + f(3\pi/4) + f(\pi)]$

c) Upper = $\frac{\pi}{4} [g(\pi/4) + \cancel{g(\pi/4)} + \cancel{g(\pi/2)} + \cancel{g(\pi)}]$

d) Lower = $\frac{\pi}{4} [g(0) + g(\pi/2) + \cancel{g(3\pi/4)} + \cancel{g(3\pi/4)}]$

e) Trap: $\frac{\pi}{4} (\frac{1}{2}) [g(0) + 2g(\pi/4) + 2g(\pi/2) + 2g(3\pi/4) + g(\pi)]$

f) Midpt: $\frac{\pi}{4} [g(\pi/8) + g(3\pi/8) + g(5\pi/8) + g(7\pi/8)]$

$$g(0) = 0$$

$$g(\pi/4) = 0.55077$$

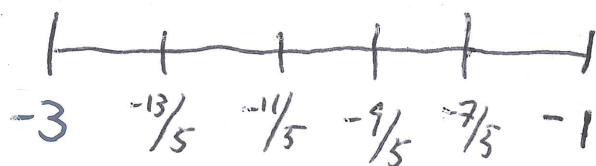
$$g(\pi/2) = 0.95$$

$$g(3\pi/4) = 0.54099$$

$$g(\pi) = 0.3097$$

3) $h(x) = x^2 + 4x$ on $[-3, -1]$ 5 subintervals

width = $\frac{-1+3}{5} = \frac{2}{5}$



a) Left $\frac{2}{5} \left[f(-3) + f(-\frac{13}{5}) + f(-\frac{11}{5}) + f(-\frac{9}{5}) + f(-\frac{7}{5}) \right]$

b) Right $\frac{2}{5} \left[f(-\frac{13}{5}) + f(-\frac{11}{5}) + f(-\frac{9}{5}) + f(-\frac{7}{5}) + f(-1) \right]$

c) Upper $= \frac{2}{5} \left[h(-\frac{13}{5}) + h(-\frac{11}{5}) + h(-\frac{9}{5}) + h(-\frac{7}{5}) + h(-1) \right]$

$h(-3) = -3$
 $h(-\frac{13}{5}) = -3.64$
 $h(-\frac{11}{5}) = -3.96$
 $h(-\frac{9}{5}) = -3.96$
 $h(-\frac{7}{5}) = -3.64$
 $h(-1) = -3$

Lower $= \frac{2}{5} \left[h(-3) + h(-\frac{13}{5}) + h(-\frac{11}{5}) + h(-\frac{9}{5}) + h(-1) \right]$

d) Trap: $\left(\frac{2}{5}\right)\left(\frac{1}{2}\right) \left[h(-3) + 2h(-\frac{13}{5}) + 2h(-\frac{11}{5}) + 2h(-\frac{9}{5}) + 2h(-\frac{7}{5}) + h(-1) \right]$

e) Midpt: $\frac{2}{5} \left[h(-\frac{14}{5}) + h(-\frac{12}{5}) + h(-\frac{10}{5}) + h(-\frac{8}{5}) + h(-\frac{6}{5}) \right]$