

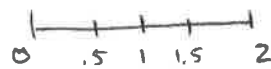
Section 7.6

Math 122 HW #6

#1a, 6b, 10c, 21b, 23b

7.6 #1a

$\int_0^2 (3x^2+2) dx$ , trap. rule  $n=4$ .



$\Delta x = .5$

$$A_{\text{trap}} = \frac{b-a}{n} \left( \frac{1}{2}f(0) + f(.5) + \dots + f(1.5) + \frac{1}{2}f(2) \right)$$

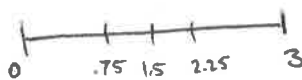
$$= \frac{2}{4} \left( \frac{1}{2} \cdot (3 \cdot 0^2 + 2) + (3 \cdot .5^2 + 2) + \dots + (3 \cdot 1.5^2 + 2) + \frac{1}{2} (3 \cdot 2^2 + 2) \right)$$

$$= 12.25$$

#6b

$\int_0^3 (2x^3+1) dx$

Simp rule  $n=4$ .



$\Delta x = \frac{b-a}{n} = \frac{3}{4}$

$$A_{\text{Simp}} = \frac{b-a}{3n} \left( f(0) + 4f(.75) + 2f(1.5) + 4f(2.25) + f(3) \right)$$

$$= \frac{3}{12} \left( 2 \cdot 0^3 + 1 + 4(2 \cdot .75^3 + 1) + 2(2 \cdot 1.5^3 + 1) + 4(2 \cdot 2.25^3 + 1) + 2 \cdot 3^3 + 1 \right)$$

$$= ~~43.5~~ 43.5$$

#10c

$\int_0^4 x \sqrt{2x^2+1} dx$

$u = 2x^2+1$

$du = 4x dx$

$$= \int_{x=0}^{x=4} \sqrt{u} \cdot \frac{1}{4} du = \frac{1}{4} \int u^{1/2} du = \frac{1}{4} \cdot \frac{2}{3} u^{3/2} \Big|_{x=0}^{x=4}$$

$$= \frac{1}{6} (2x^2+1)^{3/2} \Big|_0^4 = \frac{1}{6} (2 \cdot 4^2 + 1)^{3/2} - \frac{1}{6} (1)^{3/2}$$

~~$\frac{1}{6} (2 \cdot 4^2 + 1)^{3/2} - \frac{1}{6} (1)^{3/2}$~~

$$= \frac{1}{6} 33^{3/2} - \frac{1}{6} \approx 31.43$$

#21b

Trap rule:

$$A \approx \frac{b-a}{n} \left( \frac{1}{2} f(1) + f(2) + \dots + f(6) + \frac{1}{2} f(7) \right)$$

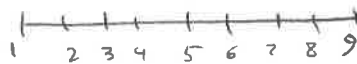
$$= \frac{7-1}{6} \left( \frac{1}{2} \cdot 4 + .6 + .9 + 1.1 + 1.3 + 1.4 + \frac{1}{2} \cdot 1.6 \right)$$

$$= 6.3$$

#23b

$$y = e^{-t^2} + \frac{1}{t+1}$$

Simpson.  $n=8$  from  $t=1$  to  $t=9$



$$\frac{b-a}{3n} \left( f(1) + 4f(2) + 2f(3) + \dots + 4f(8) + f(9) \right)$$

$$= \frac{9-1}{3 \cdot 8} \left( e^{-1^2} + \frac{1}{1+1} + 4 \left( e^{-2^2} + \frac{1}{2+1} \right) + \dots + 4 \left( e^{-8^2} + \frac{1}{8+1} \right) + e^{-9^2} + \frac{1}{9+1} \right)$$