BONUS ASSIGNMENT
NYA ELECTRO
TRAPEZOID & SIMPSON'S RULE
SOLUTIONS

(i) (a) TRAPEZOID $n=6$

$$\int_0^3 \left(3x^2-x^3\right)^{0.6}dx \approx \frac{3-0}{6}\left[\frac{\left(3(0)^2-0^3\right)^{0.6}}{2} + \left(3(0.5)^2-(0.5)^3\right)^{0.6} + \left(3(1)^2-1^3\right)^{0.6} + \left(3(1.5)^2-1.5^3\right)^{0.6} + \left(3(2)^2-2^3\right)^{0.6} + \left(3(2.5)^2-2.5^3\right)^{0.6} + \left(3(3)^2-3^3\right)^{0.6}\right]$$

$$= \frac{1}{2}\left[8.62324\right] = \boxed{4.3116}$$

(b) SIMPSON'S RULE $n=6$

$$\int_0^3 \left(3(x^2)-x^3\right)^{0.6}dx \approx \frac{3-0}{3(6)}\left[\left(3(0)^2-0^3\right)^{0.6} + 4\left(3(0.5)^2-0.5^3\right)^{0.6} + 2\left(3(1)^2-1^3\right)^{0.6} + 4\left(3(1.5)^2-1.5^3\right)^{0.6} + 2\left(3(2)^2-2^3\right)^{0.6} + 4\left(3(2.5)^2-2.5^3\right)^{0.6} + \left(3(3)^2-3^3\right)^{0.6}\right]$$

$$= \frac{1}{6}\left[26.86675\right] \approx \boxed{4.4777}$$

(ii) (a) TRAPEZOID RULE $n=4$

$$\int_0^{2.4} \frac{1}{\left(4+\sqrt{x}\right)^{3/2}}dx \approx \frac{2.4-0}{4}\left[\frac{\frac{1}{4^{3/2}}}{2} + \left(\frac{1}{4+\sqrt{0.6}}\right)^{3/2} + \left(\frac{1}{4+\sqrt{1.2}}\right)^{3/2} + \left(\frac{1}{4+\sqrt{1.8}}\right)^{3/2} + \frac{\left(\frac{1}{4+\sqrt{2.4}}\right)^{3/2}}{2}\right]$$

$$= 0.6\left[0.36454\right] \approx \boxed{0.2187}$$

(b) SIMPSON'S RULE $n=4$

$$\int_0^{2.4} \frac{1}{(4+\sqrt{x})^{3/2}}\,dx = \frac{2.4}{12}\left[\left(\frac{1}{4+\sqrt{0}}\right)^{3/2} + 4\left(\frac{1}{4+\sqrt{0.6}}\right)^{3/2} + 2\left(\frac{1}{4+\sqrt{1.2}}\right)^{3/2} + 4\left(\frac{1}{4+\sqrt{1.8}}\right)^{3/2} + \left(\frac{1}{4+\sqrt{2.4}}\right)^{3/2}\right]$$

$$\approx 0.2\left[1.082786\right] \approx \boxed{0.21656}$$