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MATH 149 HOMEWORK 20 SOLUTIONS

Sec 4.4. #14. $\int_{-2}^{-1}\left(u-\frac{1}{u^2}\right)du = \int_{-2}^{-1}\left(u-u^{-2}\right)du$ (rewrite)

integrate $= \left[\frac{u^2}{2}-\frac{u^{-1}}{-1}\right]_{-2}^{-1} = \left[\frac{u^2}{2}+\frac{1}{u}\right]_{-2}^{-1} = \left(\frac{(-1)^2}{2}+\frac{1}{-1}\right)-\left(\frac{(-2)^2}{2}+\frac{1}{-2}\right)$

$= -2$

#20 $\int_0^2 (2-t)\sqrt{t}\,dt = \int_0^2 \left(2t^{1/2}-t^{3/2}\right)dt$ (rewrite)

integrate $= \left[2\,\frac{t^{3/2}}{3/2}-\frac{t^{5/2}}{5/2}\right]_0^2 = \left[\frac{4}{3}t^{3/2}-\frac{2}{5}t^{5/2}\right]_0^2$

$= \left(\frac{4}{3}2^{3/2}-\frac{2}{5}2^{5/2}\right)-0 = 1.508$

#38. $y = x+\sin x$

Area $= \int_0^{\pi}(x+\sin x)\,dx = \left[\frac{x^2}{2}-\cos x\right]_0^{\pi} = \left(\frac{\pi^2}{2}-\cos\pi\right)-(0-\cos 0)$

$= \frac{\pi^2}{2}+2$

#50. Average value $= \dfrac{\int_0^{\pi/2}\cos x\,dx}{\pi/2-0} = \dfrac{\sin x\Big|_0^{\pi/2}}{\pi/2} = \dfrac{2}{\pi}$

$\cos x = \frac{2}{\pi} \Rightarrow x = .88$ radians