MATH 150 Homework 20 SOLUTIONS

Section 4.4 #12. $\int_{-1}^{1}(t^3-9t)\,dt = \left[\frac{t^4}{4}-\frac{9t^2}{2}\right]_{t=-1}^{t=1} = \left(\frac14-\frac92\right)-\left(\frac14-\frac92\right)=0$

#20. $\int_0^2 (2-t)\sqrt{t}\,dt = \int_0^2 (2t^{1/2}-t^{3/2})\,dt = \left[2\cdot\frac23 t^{3/2}-\frac25 t^{5/2}\right]_0^2$

$=\left(\frac43 2^{3/2}-\frac25 2^{5/2}\right)-(0)=\frac{8\sqrt2}{3}-\frac{8\sqrt2}{5}=\frac{16\sqrt2}{15}=\boxed{1.509}$

#22. $\int_{-8}^{-1}\frac{x-x^2}{2\sqrt[3]{x}}\,dx = \int_{-8}^{-1}\frac12\left(x^{1-1/3}-x^{2-1/3}\right)dx=\frac12\int_{-8}^{-1}\left(x^{2/3}-x^{5/3}\right)dx$

$\frac12\left[\frac{x^{2/3+1}}{2/3+1}-\frac{x^{5/3+1}}{5/3+1}\right]_{-8}^{-1}=\frac12\left[\frac35x^{5/3}-\frac38x^{8/3}\right]_{-8}^{-1}=\frac{4569}{80}=\boxed{57.1125}$

#23. $\int_0^3|2x-3|\,dx=\int_0^{3/2}-(2x-3)\,dx+\int_{3/2}^3(2x-3)\,dx$

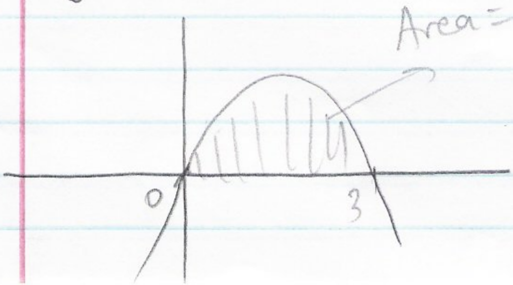
$=\left[-x^2+3x\right]_0^{3/2}+\left[x^2-3x\right]_{3/2}^3=\boxed{\frac92}$

#28. $\int_0^{\pi/4}\frac{1-\sin^2\theta}{\cos^2\theta}\,d\theta=\int_0^{\pi/4}\frac{\cos^2\theta}{\cos^2\theta}\,d\theta=\int_0^{\pi/4}1\,d\theta=\theta\Big|_0^{\pi/4}=\boxed{\pi/4}$

#38. $\int_0^\pi(x+\sin x)\,dx=\left[\frac{x^2}{2}-\cos x\right]_0^\pi=\left(\frac{\pi^2}{2}-(-1)\right)-(0-1)$

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

#42. $y=-x^2+3x$



Area $=\int_0^3(-x^2+3x)\,dx=\left[-\frac{x^3}{3}+\frac{3x^2}{2}\right]_0^3$

$=\left(-\frac{27}{3}+\frac{27}{2}\right)-(0)$

$\boxed{=\frac{27}{6}}$