Math Homework 4.4A

6. $\int \sqrt[4]{x^5}\,dx$

$= \int x^{5/4}\,dx$

$= \frac{4x^{9/4}}{9} + C$

8. $\int (v^6 - 2v^5 - v^3 + \frac{2}{7})\,dv$

$= \frac{v^7}{7} - \frac{v^6}{3} - \frac{v^4}{4} + \frac{2v}{7} + C$

10. $\int \sqrt{t}\,(t^2 + 3t + 2)\,dt$

$= \int (t^{5/2} + 3t^{3/2} + 2t^{1/2})\,dt$

$= \frac{2t^{7/2}}{7} + \frac{6t^{5/2}}{5} + \frac{4t^{3/2}}{3} + C$

12. $\int (v^2 + 1 + \frac{1}{v^2})\,dv$

$= \int (v^2 + 1 + v^{-2})\,dv$

$= \frac{v^3}{3} + v - v^{-1} + C$

14. $\int \sec t\,(\sec t + \tan t)\,dt$

$= \int (\sec^2 t + \sec t \cdot \tan t)\,dt$

$= \int \sec^2 t\,dt + \int \sec t \cdot \tan t\,dt$

$= \tan t + \sec t + C$

16. $\int \frac{\sin 2x}{\sin x}\,dx$

$= \int \frac{2\sin x \cos x}{\sin x}\,dx$

$= \int 2\cos x\,dx$

$= 2\sin x + C$

25. $\int_0^{\pi} (4\sin\theta - 3\cos\theta)\,d\theta$

$= (-4\cos\theta - 3\sin\theta)\Big|_0^{\pi}$

$= (-4\cos\pi - 3\sin\pi) - (-4\cos 0 - 3\sin 0)$

$= 8$

27. $\int_1^4 \left(\frac{4 + 6u}{\sqrt{u}}\right) du$

$= \int_1^4 \frac{4}{\sqrt{u}}\,du + \int_1^4 \frac{6u}{\sqrt{u}}\,du$

$= \left(8u^{1/2} + 4u^{3/2}\right)\Big|_1^4$

$= 8u^{1/2}\Big|_1^4 + 4u^{3/2}\Big|_1^4$

$= 8 + 28 = 36$

33. $\int_0^{\pi/4} \frac{1 + \cos^2\theta}{\cos^2\theta}\,d\theta$

$= \int_0^{\pi/4} \frac{1}{\cos^2\theta}\,d\theta + \int_0^{\pi/4} \frac{\cos^2\theta}{\cos^2\theta}\,d\theta$

$= \int_0^{\pi/4} \sec^2\theta\,d\theta + \int_0^{\pi/4} 1\,d\theta$

$= (\tan\theta + 1)\Big|_0^{\pi/4}$

$= \tan\frac{\pi}{4} + \frac{\pi}{4}$

$= 1 + \frac{\pi}{4}$

37. $\int_0^1 \left(\sqrt[4]{x^5} + \sqrt[5]{x^4}\right) dx$

$= \int_0^1 \sqrt[4]{x^5}\,dx + \int_0^1 \sqrt[5]{x^4}\,dx$

$= \frac{4}{9}x^{9/4}\Big|_0^1 + \frac{5}{9}x^{9/5}\Big|_0^1$

$= 1$

39. $\int_2^5 |x - 3|\,dx$

$= \int_2^3 -(x-3)\,dx + \int_3^5 (x-3)\,dx$

$= \left(-\frac{x^2}{2} + 3x\right)\Big|_2^3 + \left(\frac{x^2}{2} - 3x\right)\Big|_3^5$

$= \frac{1}{2} + 2$

$= \frac{5}{2}$

41. $\int_{-1}^{2} (x - 2|x|)\,dx$

[illegible]

$= \int_{-1}^{0} (x + 2x)\,dx + \int_0^2 (x - 2x)\,dx$

[illegible]

$= \int_{-1}^{0} 3x\,dx + \int_0^2 -x\,dx$

$= \frac{3x^2}{2}\Big|_{-1}^{0} + -\frac{x^2}{2}\Big|_0^2$

$= -\frac{3}{2} - 2$

$= -\frac{7}{2}$