Lesson 7.2.4

7-92. See below:

a. $-\frac{5}{6}(3x-5)^4 + C$

b. $-\ln|\cos x| + C$

c. $\frac{1}{75}\cos^{-5}(5x)^3 + C$

d. $-\frac{10}{3}\ln|3x-5| + C$

e. $-\ln|\cos x| + C$

f. $-\frac{1}{15}\frac{1}{\sin(5x^3-9x^5)} + C$

7-93. See below:

$u = x^3 + 1$

$\int_1^0 \sqrt{u}\,du$

$u = x^2 + 2$

$\int_6^3 \frac{1}{2}u^3\,du$

$u = \sin 2x$

$\int_6^3 u^2\,du$

7-94. See below:

a. $\int \frac{u+8}{u}du = u + 8\ln|u| + C = x - 3 + 8\ln|x-3| + C$

b. $\int_{-4}^{-1} \frac{u+8}{u}du \approx -8.0903$

c. Rewrite the integral by using polynomial division.

7-95. $y = \ln|\sin x| + C$

7-96. See below:

a. Since $\frac{dV}{dt} = \sqrt{t+1}$, $V = \frac{2}{3}(t+1)^{3/2} + C$. In 8 seconds, $17\frac{1}{3}$ ounces leaked from the tank.

b. After 3 seconds, 18 ounces were pumped in, but $\frac{14}{3}$ ounces leaked out. Adding in the 256 initial ounces, there are $269\frac{1}{3}$ ounces. After 8 seconds, $256 + 48 - 17\frac{1}{3} = 286\frac{2}{3}$ ounces. In general, $V(t) = \frac{770}{3} + 6t - \frac{2}{3}(t+1)^{3/2}$.

c. At 35 seconds, there are $321\frac{1}{3}$ ounces of gas.

Review & Preview

7-97. See below:

a. $-9x(3x^2 - 2)^2$

b. $18 \ln 6 \cdot x(3x^2 - 2)^2 \cdot 6^{(3x^2-2)^3}$

c. $\frac{-5x^4 \sin(x^5)}{8y}$ or $\frac{\pm 5x^4 \sin(x^5)}{4\sqrt{9+\cos(x^5)}}$

7-98. See below:

a. $\frac{60}{\ln 4}$

b. $\frac{1}{\ln 7} 7^{3t^2} + C$

c. $\frac{1}{9}\sin^3(3m - 1) + C$

7-99. $y = 3e^{4x} - \ln|x| + C$ for any C

7-100. $-\frac{75}{\sqrt{106}}$ approx; $-7.285 \frac{\text{ft}}{\text{sec}}$

7-101. Anne. First rewrite the integral as $y = \int 1\,dx$.

7-102. See below:

a. 77.870 feet

b. 3.5 feet

7-103. $a = \frac{1}{8} \ln 2$, $b = \ln 2$, $c = 1$, $d = 2 \ln 2 + 1$