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Pg. 456 #15-29 odd, 32, 33-37 odd

15. $\int m^3 \ln m \, dm$

$$= m^{3+1} \left[\frac{\ln m}{3+1} - \frac{1}{(3+1)^2} \right] + C \quad (1)$$

$$= m^4 \left[\frac{\ln m}{4} - \frac{1}{16} \right] + C \quad (2)$$

$$= \frac{m^4}{4} (\ln m) - \frac{m^4}{16} + C \quad (3)$$

17. $\int \frac{dm}{\sqrt{m^2 + 7}}$

$$= \ln \left| m + \sqrt{m^2 + \sqrt{7}^2} \right| + C \quad (4)$$

$$= \ln \left| m + \sqrt{m^2 + 7} \right| + C \quad (5)$$

$$(6)$$

19. $\int \frac{10 \, dm}{m(5-7m)^2}$

$$= 10 \left(\frac{1}{5(5-7m)} + \frac{1}{5^2} \ln \left| \frac{m}{5-7m} \right| + C \right) \quad (7)$$

$$= \frac{2}{5-7m} + \frac{2}{5} \ln \left| \frac{m}{5-7m} \right| + C \quad (8)$$

21. $\int \frac{-5}{4m^2 - 1} \, dm$

$$= -\frac{5}{4} \int \frac{1}{m^2 - \frac{1}{4}} \, dm \quad (9)$$

$$= -\frac{5}{4} \left(\frac{1}{2(\frac{1}{2})} \ln \left| \frac{m - \frac{1}{2}}{m + \frac{1}{2}} \right| + C \right) \quad (10)$$

$$= -\frac{5}{4} \ln \left| \frac{m - \frac{1}{2}}{m + \frac{1}{2}} \right| + C \quad (11)$$

$$(12)$$

$$23. \int \sqrt{4m^2 + 16} \, dm$$

$$= 2 \int \sqrt{m^2 + 4} \, dm \quad (13)$$

$$= 2 \left(\frac{1}{2} \left[m\sqrt{m^2 + 4} + 4 \ln \left| m + \sqrt{m^2 + 4} \right| \right] + C \right) \quad (14)$$

$$= m\sqrt{m^2 + 4} + 4 \ln \left| m + \sqrt{m^2 + 4} \right| + C \quad (15)$$

$$25. \int \frac{-5 \ln x}{x^3} \, dx$$

$$= -5 \int x^{-3} \ln x \, dx \quad (16)$$

$$= -5 \left(x^{-3+1} \left[\frac{\ln x}{-3+1} - \frac{1}{(-3+1)^2} \right] + C \right) \quad (17)$$

$$= -5x^{-2} \left[\frac{\ln x}{-2} - \frac{1}{4} \right] + C \quad (18)$$

$$= \frac{5}{2x^2} (\ln x) + \frac{5}{4x^2} + C \quad (19)$$

$$27. \int \frac{e^x}{x^{-3}} \, dx$$

$$= \int x^3 e^x \, dx \quad (20)$$

$$= \frac{x^3 e^x}{1} - \frac{3}{1} \int x^{3-1} e^x \, dx + C \quad (21)$$

$$= x^3 e^x - 3 \int x^2 e^x \, dx + C \quad (22)$$

$$\int x^2 e^x \, dx = \begin{array}{c} \begin{array}{cc} D & I \\ \hline x^2 & + \\ 2x & - \\ 2 & + \\ 0 & \end{array} \begin{array}{c} e^x \\ e^x \\ e^x \\ e^x \end{array} \end{array} = x^2 e^x - 2x e^x + 2e^x + C \quad (23)$$

$$\int \frac{e^x}{x^{-3}} \, dx = x^3 e^x - 3 (x^2 e^x - 2x e^x + 2e^x) + C \quad (24)$$

$$= x^3 e^x - 3x^2 e^x + 6x e^x - 6e^x + C \quad (25)$$

$$29. \int x\sqrt{1+2x} \, dx$$

$$= \frac{2}{15(2)^2} (3(2)x - 2(1))(1+2x)^{3/2} + C \quad (26)$$

$$= \frac{2}{60} \cdot 2(3x-1)(1+2x)^{3/2} + C \quad (27)$$

$$= \frac{1}{15} (3x-1)(1+2x)^{3/2} + C \quad (28)$$

$$32. \quad p'(t) = \frac{1}{t(2+t)^2}, \quad p(2) = 0.8267$$

$$p(t) = \frac{1}{2(2+t)} + \frac{1}{4} \ln \left| \frac{t}{2+t} \right| + C \quad (29)$$

$$0.8267 = \frac{1}{2(2+(2))} + \frac{1}{4} \ln \left| \frac{(2)}{2+(2)} \right| + C \quad (30)$$

$$-C = \frac{1}{8} + \frac{1}{4} \ln \left| \frac{1}{2} \right| - 0.8267 \quad (31)$$

$$\approx 0.875 \quad (32)$$

$$p(t) = \frac{1}{2(2+t)} + \frac{1}{4} \ln \left| \frac{t}{2+t} \right| + 0.875 \quad (33)$$

$$33. \int \frac{8}{3x^2 - 2x} \, dx$$

$$= -8 \int \frac{1}{x(2-3x)} \, dx \quad (34)$$

$$= -8 \left(\frac{1}{2} \ln \left| \frac{x}{2-3x} \right| + C \right) \quad (35)$$

$$= -4 \ln \left| \frac{x}{2-3x} \right| + C \quad (36)$$

$$35. \int \frac{dx}{x^3 - 4x^2 + 4x}$$

$$= \int \frac{1}{x(x-2)^2} \, dx \quad (37)$$

$$= \frac{-1}{2(x-2)} + \frac{1}{4} \ln \left| \frac{x}{x-2} \right| + C \quad (38)$$

$$37. \int \frac{-e^{-2x} dx}{9 - 6e^{-x} + e^{-2x}}$$

$$= - \int \frac{e^{-2x} dx}{9 - 6e^{-x} + e^{-2x}} \tag{39}$$

$$= \left[\begin{array}{l} u = e^{-x} \\ du = -e^{-x} dx \end{array} \right] = \int \frac{u du}{9 - 6u + u^2} \tag{40}$$

$$= \int \frac{u du}{(u - 3)^2} \tag{41}$$

$$= \frac{-3}{1(u - 3)} + \frac{1}{1} \ln |u - 3| + C \tag{42}$$

$$= \frac{-3}{(e^{-x} - 3)} + \ln |e^{-x} - 3| + C \tag{43}$$