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Pg. 423 #35-57 odd, 73, 75, 93, 99

$$35. \int_0^{1.5} (x - x^2) dx$$

$$= \frac{x^2}{2} - \frac{x^3}{3} \quad (1)$$

$$= \left(\frac{(1.5)^2}{2} - \frac{(1.5)^3}{3} \right) + \left(\frac{(0)^2}{2} - \frac{(0)^3}{3} \right) \quad (2)$$

$$= 0; \quad \text{The area above the x-axis is equal to the area below the x-axis} \quad (3)$$

$$37. \int_{-1}^1 (x^4 - x^2) dx$$

$$= \frac{x^5}{5} - \frac{x^3}{3} \quad (4)$$

$$= \left(\frac{(1)^5}{5} - \frac{(1)^3}{3} \right) - \left(\frac{(-1)^5}{5} - \frac{(-1)^3}{3} \right) \quad (5)$$

$$= -\frac{4}{15}; \quad \text{The area above the x-axis is less than the area below the x-axis} \quad (6)$$

39.

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julia> import Pkg; Pkg.add("QuadGK"); using QuadGK
julia> f(x) = x - x^2
julia> quadgk(f, 0, 1.5)
(0.0, 0.0)
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41.

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julia> f(x) = x^4 - x^2
julia> quadgk(f, -1, 1)
(-0.26666666666666666, 0.0)
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$$43. \int_1^3 (3t^2 + 7) dt$$

$$= 3 \frac{x^3}{3} + 7x \quad (7)$$

$$= x^3 + 7x \quad (8)$$

$$= ((3)^3 + 7(3)) - ((1)^3 + 7(1)) \quad (9)$$

$$= 40 \quad (10)$$

$$\begin{aligned}
 45. \quad & \int_1^4 (\sqrt{x} - 1) dx \\
 &= \frac{2}{3}x^{3/2} - x
 \end{aligned} \tag{11}$$

$$= \left(\frac{2}{3}(4)^{3/2} - (4) \right) - \left(\frac{2}{3}(1)^{3/2} - (1) \right) \tag{12}$$

$$= \frac{5}{3} \tag{13}$$

$$\begin{aligned}
 47. \quad & \int_{-2}^5 (2x^2 - 3x + 7) dx \\
 &= \frac{2}{3}x^3 - \frac{3}{2}x^2 + 7x
 \end{aligned} \tag{14}$$

$$= \left(\frac{2}{3}(5)^3 - \frac{3}{2}(5)^2 + 7(5) \right) - \left(\frac{2}{3}(-2)^3 - \frac{3}{2}(-2)^2 + 7(-2) \right) \tag{15}$$

$$= 106\frac{1}{6} \tag{16}$$

$$\begin{aligned}
 49. \quad & \int_{-5}^2 e^t dt \\
 &= e^t
 \end{aligned} \tag{17}$$

$$= e^{(2)} - e^{(-5)} \tag{18}$$

$$\approx 7.382 \tag{19}$$

$$\begin{aligned}
 51. \quad & \int_a^b \frac{1}{2}x^2 dx \\
 &= \frac{1}{6}x^3 dx
 \end{aligned} \tag{20}$$

$$= \left(\frac{1}{6}(b)^3 \right) - \left(\frac{1}{6}(a)^3 \right) \tag{21}$$

$$= \frac{b^3 - a^3}{6} \tag{22}$$

$$\begin{aligned}
 53. \quad & \int_a^b e^{2t} dt \\
 &= \frac{1}{2}e^{2t}
 \end{aligned} \tag{23}$$

$$= \left(\frac{1}{2}e^{2(b)} \right) - \left(\frac{1}{2}e^{2(a)} \right) \tag{24}$$

$$= \frac{e^{2b} - e^{2a}}{2} \tag{25}$$

$$55. \int_1^e \left(x + \frac{1}{x} \right) dx$$

$$= \frac{x^2}{2} + \ln x \quad (26)$$

$$= \left(\frac{(e)^2}{2} + \ln 2 \right) - \left(\frac{(1)^2}{2} + \ln 1 \right) \quad (27)$$

$$\approx 4.195 \quad (28)$$

$$57. \int_0^2 \sqrt{2x} dx$$

$$= \frac{2\sqrt{2}x^{3/2}}{3} \quad (29)$$

$$= \left(\frac{2\sqrt{2}(2)^{3/2}}{3} \right) - \left(\frac{2\sqrt{2}(0)^{3/2}}{3} \right) \quad (30)$$

$$= \frac{8}{3} \quad (31)$$

$$73. \quad v(t) = 3t^2, \quad s(0) = 4$$

$$s(t) = \frac{3t^3}{3} + C \quad (32)$$

$$= t^3 + C \quad (33)$$

$$4 = (0)^3 + C \quad (34)$$

$$C = 4 \quad (35)$$

$$s(t) = t^3 + 4 \quad (36)$$

$$75. \quad a(t) = 4t, \quad v(0) = 20$$

$$v(t) = \frac{4t^2}{2} + C \quad (37)$$

$$= 2t^2 + C \quad (38)$$

$$20 = 2(0)^2 + C \quad (39)$$

$$C = 20 \quad (40)$$

$$v(t) = 2t^2 + 20 \quad (41)$$

$$93. \int_2^3 \frac{x^2 - 1}{x - 1} dx$$

$$= \int_2^3 \frac{(x + 1)(x - 1)}{x - 1} dx \quad (42)$$

$$= \int_2^3 (x - 1) dx \quad (43)$$

$$= \frac{x^2}{2} - x \quad (44)$$

$$= \left(\frac{(3)^2}{2} - (3) \right) - \left(\frac{(2)^2}{2} - (2) \right) \quad (45)$$

$$= 1.5 \quad (46)$$

$$97. \int_1^8 \frac{\sqrt[3]{x^2} - 1}{\sqrt[3]{x}} dx$$

$$= \int_1^8 (x^{2/3} - 1) \cdot x^{-1/3} dx \quad (47)$$

$$= \int_1^8 x^{1/3} - x^{-1/3} dx \quad (48)$$

$$= \frac{3x^{4/3}}{4} - \frac{3x^{2/3}}{2} \quad (49)$$

$$= 6.75 \quad (50)$$

$$99. \int_2^5 (t + \sqrt{3})(t - \sqrt{3}) dt$$

$$= \int_2^5 t^2 - 3 dt \quad (51)$$

$$= \frac{t^3}{3} - 3t \quad (52)$$

$$= \left(\frac{(5)^3}{3} - 3(5) \right) - \left(\frac{(2)^3}{3} - 3(2) \right) \quad (53)$$

$$= 30 \quad (54)$$