4.4 day 3 hw (p. 288, 51, 52, 55-60, 67-72, 73a, 74a)

51. Average Value: $\frac{1}{6}\int_{-3}^{3} f(x)\,dx = 6$, $\quad 9 - x^2 = 6,\ x = \pm 1.732$

52. Average Value: $\frac{1}{2}\int_{1}^{3} f(x)\,dx = 5.333$, $\quad \frac{4\left(x^2+1\right)}{x^2} = \frac{16}{3},\ 12x^2 + 12 = 16x^2,\ x = \sqrt{3}$

$\left(-\sqrt{3}\text{ doesn't work b/c it's not in domain}\right)$

55. Average Value: $\frac{1}{\pi}\int_{0}^{\pi} f(x)\,dx = 0.636$, $\sin x = 0.636,\ x = 0.690$ and 2.451

56. Average Value: $\frac{1}{\pi/2}\int_{0}^{\pi/2} f(x)\,dx = 0.636$, $\cos x = 0.636,\ x = 0.881$

$\left(5.402\text{ doesn't work b/c it's not in domain}\right)$

57. Area is approximately 540.

58. Area is approximately 150.

59. a) 8 b) 4/3 c) 10/3

60. $r(t) = \int r'(t)\,dt$ which would be the total change in weight of the dog.

$\int_{2}^{6} r'(t)\,dt = r(6) - r(2)$ …the difference in weight between the 6th and 2nd years.

67. $F(x) = 2t^2 - 7t$ $\qquad F(2) = -6,\ F(5) = 15,\ F(8) = 72$

68. $F(x) = \frac{1}{4}t^4 + t^2 - 2t\,|_2^x = \left(\frac{1}{4}x^4 + x^2 - 2x\right) - (4 + 4 - 4) = \frac{1}{4}x^4 + x^2 - 2x - 4$

$F(2) = 0$ $\qquad F(5) = 167.25$ $\qquad F(8) = 1068$

69. $F(x) = -20v^{-1}\,|_1^x = -20(x)^{-1} - \left(-20(1)^{-1}\right) = -20(x)^{-1} + \frac{1}{20}$

$F(2) = 10$ $\qquad F(5) = 16$ $\qquad F(8) = 17.5$

70. $F(x) = t^{-2}\,|_2^x = x^{-2} - 0.25$

$F(2) = 0$ $\qquad F(5) = -21/100$ $\qquad F(8) = -15/64$

71. $F(x) = \sin\theta\,|_1^x = \sin x - \sin(1)$

$F(2) = 0.067$ $\qquad F(5) = -1.800$ $\qquad F(8) = 0.148$

72. $F(x) = -\cos\theta\,|_0^x = -\cos x - (-\cos 0) = -\cos x + 1$

$F(2) = 1.416$ $\qquad F(5) = 0.716$ $\qquad F(8) = 1.145$

73a. $g(0)=0,\ g(2)=7,\ g(4)=9,\ g(6)=8,\ g(8)=5$

74a. $g(0)=0,\ g(2)=-4,\ g(4)=-8,\ g(6)=-2,\ g(8)=4$