

## Math Homework 4.4B

48.  $I(t) = Q'(t)$

$$\int_a^b I(t) dt = Q(t)$$

Total charge from a to b

60. 
$$\int_0^{10} (200 - 4t) dt$$

$$= (200t - 2t^2) \Big|_0^{10}$$

$$= 1800 \text{ L}$$

50.  $100 + \int_0^{15} n'(t) dt$

$$= 100 + n(t)$$

Total number of bees after  
15 weeks

62. a. Lower:  $2 + 10 + 24 + 36 + 46 + 54 = 116 \text{ tons}$

Upper:  $10 + 24 + 36 + 46 + 54 + 60 = 224 \text{ tons}$

b. Midpoint:  $2(10 + 36 + 54) = 200 \text{ tons}$

52.  $\int_3^5 f(x) dx$

Total height change from 3  
to 5 miles

64. Midpoint:  $1500 + 1350 + 750 - 700 = 3300 \text{ L}$

$$25000 + 3300 = 28300 \text{ L}$$

54.  $\frac{dt}{dx} = \frac{1b}{ft} \cdot \frac{1}{ft} = \frac{1b}{ft^2}$

$$\int_2^b a(x) dx = \frac{1b}{ft} \cdot ft = 1b$$

56. a. 
$$\int_2^4 (t^2 - 2t - 3) dt$$

$$= \left( \frac{t^3}{3} - t^2 - 3t \right) \Big|_2^4$$

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

b. 
$$\int_2^4 |t^2 - 2t - 3| dt$$

$$t^2 - 2t - 3 = 0$$

$$(t-3)(t+1) = 0 ; t = -1, 3$$

$$-\int_2^3 (t^2 - 2t - 3) dt + \int_3^4 (t^2 - 2t - 3) dt$$

$$= -\left( \frac{t^3}{3} - t^2 - 3t \right) \Big|_2^3 + \left( \frac{t^3}{3} - t^2 - 3t \right) \Big|_3^4$$

$$= 4$$

58. a.  $a(t) = 2t + 3$

$$v(t) = \int (2t + 3) dt$$

$$= t^2 + 3t + C$$

$$0^2 + 3(0) + C = -4 ; C = -4$$

$$v(t) = t^2 + 3t - 4$$

b. 
$$\int_0^3 v(t) dt$$

$$= \int_0^3 (t^2 + 3t - 4) dt$$

$$= \left( \frac{t^3}{3} + \frac{3t^2}{2} - 4t \right) \Big|_0^3$$

$$= \frac{3}{2} \text{ m}$$