

5.4: 54.  $100 + \int_0^{15} n'(t) dt$  means the honeybee  
population after 15 weeks.

5.4. 56.  $\int_3^5 f(x) dx$  means the distance difference in the y-direction between the two spots.

5.4: 58.  $\frac{da}{dx}$  has units pounds per foot squared  
 $\int_2^8 a(x) dx$  has units pounds.

5.5: 26.  $\int \frac{dx}{ax+b} \quad (a \neq 0)$

~~Let~~  $u = ax+b$

$$du = a dx$$

$$dx = \frac{1}{a} du$$

$$\int \frac{dx}{ax+b} = \frac{1}{a} \int \frac{1}{u} du = C + \frac{1}{a} \ln|u| = \frac{1}{a} \ln|ax+b| + C$$

5.5: 64.  $\int_0^a x \sqrt{a^2 - x^2} dx$

$$u = a^2 - x^2$$

$$du = -2x dx$$

$$-\frac{1}{2} du = x dx$$

$$\int_0^a x \sqrt{a^2 - x^2} dx = -\frac{1}{2} \int_{x=0}^{x=a} u^{\frac{1}{2}} du =$$

$$-\frac{1}{2} \left( \frac{2}{3} u^{\frac{3}{2}} \right) \Big|_{x=0}^{x=a} = -\frac{1}{3} (a^2 - x^2)^{\frac{3}{2}} \Big|_0^a =$$

$$-\frac{1}{3} (a^2 - a^2)^{\frac{3}{2}} + \frac{1}{3} (a^2)^{\frac{3}{2}} = \frac{1}{3} a^3$$

J.5: 88

$$\int_0^9 f(x) dx = 4$$

$$F'(x) = f(x)$$

$$F(9) - F(0) = 4$$

$$\int_0^3 x f(x^2) dx = \frac{1}{2} F(x^2) \Big|_0^3$$

$$= \frac{1}{2} (F(3^2) - F(0))$$

$$= \frac{1}{2} \cdot 4 = 2$$