

Pg 382 # 1-7(0), 11, 12, 19, 20, 29, 39, 51, ~~52~~ 53

$$1) \int dy = \int x + 3 dx$$

$$y = \frac{x^2}{2} + 3x + C$$

$$3) \int \frac{1}{y+3} dy = \int dx$$

$$\ln(y+3) = x + C$$

$$y+3 = Ce^x$$

$$y = Ce^x - 3$$

$$5) \int y dy = \int 5x dx$$

$$\frac{y^2}{2} = \frac{5x^2}{2} + C$$

$$7) \int \frac{1}{y} dy = \int x^{1/2} dx$$

$$\ln y = \frac{2}{3} x^{3/2} + C$$

$$y = Ce^{\frac{2}{3} x^{3/2}}$$

$$11) Q' = \frac{k}{t^2} \quad \frac{dQ}{dt} = \frac{k}{t^2}$$

$$\int dQ = \int \frac{k}{t^2} dt$$

$$Q = -\frac{k}{t} + C$$

$$12) \quad P' = k(25-t)$$

$$\frac{dP}{dt} = k(25-t)$$

$$\int dP = \int k(25-t) dt$$

$$P = -k \frac{(25-t)^2}{2} + C$$

$$u = 25-t$$

$$du = -dt$$

$$19) \quad N' = kN$$

$$\frac{dN}{dt} = kN$$

$$\int \frac{1}{N} dN = \int k dt$$

$$\ln N = kt + C$$

$$N = Ce^{kt}$$

$$250 = Ce^0$$

$$C = 250$$

$$N = 250e^{kt}$$

$$400 = 250e^k$$

$$k = .47$$

$$N = 250e^{.47t}$$

$$N = 250e^{1.88} = 1638$$

$$20) \quad P' = kP$$

$$\frac{dP}{dt} = kP$$

$$\int \frac{1}{P} dP = \int k dt$$

$$\ln P = kt + C$$

$$P = Ce^{kt}$$

$$5000 = Ce^0$$

$$C = 5000$$

$$P = 5000e^{kt}$$

$$4750 = 5000e^k$$

$$k = ~~0.0513~~ -0.0513$$

~~$$P = 5000e^{kt}$$~~

$$P = 5000e^{-.0513t}$$

$$P = 5000e^{-.256} = 3869$$

$$29) A = A_0 e^{kt}$$

$$10 = 20 e^{k(1599)}$$

$$k = -4.33 \times 10^{-4}$$

$$A = 20 e^{(-4.33 \times 10^{-4})(1000)} = 13 \text{ g}$$

$$A = 20 e^{(-4.33 \times 10^{-4})(19000)} = .26 \text{ g}$$

$$39) A = A_0 e^{.12t}$$

$$A = 1000 e^{.12t}$$

$$2000 = 1000 e^{.12t}$$

$$t = 5.78 \text{ yrs}$$

$$A = 1000 e^{.12(10)} = \$3320.12$$

$$51) N = N_0 e^{kt}$$

$$a) 2.0 = N_0 e^{-.006(5)}$$

$$N_0 = 2.27$$

$$N = 2.27 e^{-.006t}$$

$$b) N = 2.27 e^{-.006(10)} = 2.14$$

c) Population is decreasing \Rightarrow k is negative

$$53) A = A_0 e^{kt}$$

$$a) 37.1 = N_0 e^{.032(5)}$$

$$N_0 = 31.6$$

$$b) N = 31.6 e^{.032(10)} = 43.5$$

c) Population increasing \Rightarrow k is positive

$\frac{1}{2} \times 100 = 50$
 $\frac{1}{3} \times 100 = 33.33$
 $\frac{1}{4} \times 100 = 25$
 $\frac{1}{5} \times 100 = 20$
 $\frac{1}{6} \times 100 = 16.67$
 $\frac{1}{7} \times 100 = 14.29$
 $\frac{1}{8} \times 100 = 12.5$
 $\frac{1}{9} \times 100 = 11.11$
 $\frac{1}{10} \times 100 = 10$

2) $A = A$
 $\frac{1}{2} \times 100 = 50$
 $\frac{1}{3} \times 100 = 33.33$
 $\frac{1}{4} \times 100 = 25$
 $\frac{1}{5} \times 100 = 20$

$A = 100$

3) $A = 100$
 $\frac{1}{2} \times 100 = 50$
 $\frac{1}{3} \times 100 = 33.33$
 $\frac{1}{4} \times 100 = 25$
 $\frac{1}{5} \times 100 = 20$

$A = 100$

4) $A = 100$

$\frac{1}{2} \times 100 = 50$
 $\frac{1}{3} \times 100 = 33.33$
 $\frac{1}{4} \times 100 = 25$
 $\frac{1}{5} \times 100 = 20$

$A = 100$

$A = 100$