

$$1) A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$a) A = 5000\left(1 + \frac{.085}{4}\right)^{4(3)}$$

$$A = 5000(1.02125)^{12}$$

$$A = \$6435.09$$

$$b) 10,000 = 5000(1.02125)^{4t}$$

$$2 = 1.02125^{4t}$$

$$\log_{1.02125} 2 = 4t$$

$$t = 8.24 \text{ yrs}$$

$$3) A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$8000 = 5000\left(1 + \frac{.075}{4}\right)^{4t}$$

$$1.6 = (1.01875)^{4t}$$

$$\log_{1.01875} 1.6 = 4t$$

$$6.33 \text{ yrs} = t$$

$$5) A = Pe^{rt}$$

$$2000 = 1000e^{.085t}$$

$$2 = e^{.085t}$$

$$\ln 2 = .085t$$

$$t = 8.15 \text{ yrs}$$

$$7) A(t) = 100 e^{.055t}$$

$$= 105.65$$

$$105.65 - 100 = 5.65$$

↑  
5.65% of the original amount ← annual yield

$$9) n(t) = 12 e^{.012t}$$

$$a) 1.2\%$$

$$b) n(5) = 12 e^{.012(5)}$$

$$n(5) = 12.74 \text{ million}$$

$$c) 30 = 12 e^{.012t}$$

$$2.5 = e^{.012t}$$

$$\ln 2.5 = .012t$$

$$76.36 \text{ yrs} = t$$

$$11) n(t) = n_0 e^{rt}$$

$$n(t) = 110 e^{rt}$$

# of yrs 25

$$a) n(t) = 110 e^{.03(25)}$$

$$= 232.87 \text{ million}$$

$$b) n(t) = 110 e^{.02(25)}$$

$$= 181.36 \text{ million}$$

$$13) a) n(t) = 85 e^{.18t}$$

$$b) n(3) = 85 e^{.18(3)}$$

$$= 145.86 \text{ frogs}$$

$$145 \text{ Frogs}$$

$$c) 600 = 85 e^{.18t}$$

$$\frac{600}{85} = e^{.18t}$$

$$\ln\left(\frac{600}{85}\right) = .18t$$

$$t = 10.86 \text{ yrs}$$

$$15) A(t) = P(2)^{t/k}$$

$$a) A(t) = 1500(2)^{t/30}$$

$$b) A(120) = 1500(2)^{120/30}$$

$$= 24,000$$

$$c) 4000 = 1500(2)^{t/30}$$

$$\frac{8}{3} = 2^{t/30}$$

$$\log_2\left(\frac{8}{3}\right) = t/30 \quad t = 4.25 \text{ min}$$



$$17) A(t) = 5.7e^{.02t}$$

$$a) 10.14 = 5.7e^{.02t}$$

$$2 = e^{.02t}$$

$$\ln 2 = .02t$$

$$t = 34.66$$

2029

$$b) 3 = e^{.02t}$$

$$\ln 3 = .02t$$

$$54.93 = t$$

2049

$$19) A(t) = 1e^{2(24)}$$

$$A(24) = e^{48}$$

$$e^{48} = 10e^{2t}$$

$$\frac{e^{48}}{10} = e^{2t}$$

$$\ln \frac{e^{48}}{10} = 2t \quad t = 22.85$$

$$21) a) A(t) = 10\left(\frac{1}{2}\right)^{t/30}$$

$$b) A(80) = 10\left(\frac{1}{2}\right)^{80/30} \\ = 1.57 \text{ mg}$$

$$c) 2 = 10\left(\frac{1}{2}\right)^{t/30}$$

$$\frac{1}{5} = \left(\frac{1}{2}\right)^{t/30}$$

$$\log_{\frac{1}{2}}\left(\frac{1}{5}\right) = \frac{t}{30}$$

$$t = 69.66 \text{ yrs}$$

$$23) 5 = 100\left(\frac{1}{2}\right)^{\frac{t}{30}}$$

$$.05 = \left(\frac{1}{2}\right)^{\frac{t}{30}}$$

$$\log_{\frac{1}{2}}(.05) = \frac{t}{30}$$

$$t = 129.66 \text{ seconds}$$

$$25) a) 58 = 100 \left(\frac{1}{2}\right)^{3/k}$$
$$.58 = \left(\frac{1}{2}\right)^{3/k}$$

$$\log_{\frac{1}{2}}(.58) = 3/k$$

$$k = \frac{3}{\log_{\frac{1}{2}}(.58)}$$

$$k = 3.82 \text{ days}$$

$$b) .2 = \left(\frac{1}{2}\right)^{t/3.82}$$

$$\log_{.5} .2 = t/3.82$$

$$t = 8.88 \text{ days}$$

27) Omit

13.07  
10.8  
2