

5.4

1.  $r = 0.25$  (depreciates)  
 $P = 3750$   $A = ?$   $t = 2$   
 $A = 3750(1 - 0.25)^2$   
 $A = 2109.375$   
 $\boxed{\$2109.38}$

2.  $P = 100$  doubles  
 $A = ?$  every 21 years  
 $t = 30$

~~$P = 100$~~   
 $A = 100(2)^{30/21}$   
 $A = 269.18$   
 $\boxed{\$269.18 \text{ million}}$

3.  $P = 500$   $r = 0.14$   
 $A = ?$   $t = 22$   
 $A = 500(1 + 0.14)^{22}$   
 ~~$A = 8930.519$~~   
 $A = 8930.519$   
 $\boxed{8930 \text{ bees}}$

4.  $P = 25$   $n = 12$   $t = 5$   $t = 20$   
 $A = 25(\frac{1}{2})^{5/12}$   
 $A = 18.7288$   $\boxed{18.73 \text{ lbs}}$   
 $A = 25(\frac{1}{2})^{20/12}$   
 $A = 7.875$   $\boxed{7.87 \text{ lbs}}$

5.  $A = 5000(1 + \frac{0.06}{4})^{4 \cdot 16}$   
 $A = 9070.09$

No. If Carol invests all her cash she will have  $\$70.09$  extra.

6.  $A = 20,000$   $t = 5$   $P = ?$   
 $r = 0.0975$  weekly  $n = 52$   
 $20000 = P(1 + \frac{0.0975}{52})^{5 \cdot 52}$

$$P = \frac{20000}{(1 + \frac{0.0975}{52})^{5 \cdot 52}}$$

$$P = 12288.81$$
  
 $\boxed{\$12,288.81}$

7.  $P = 7500$   $r = 8.35\% = 0.0835$   
 $t = 12$   
 $A = 7500e^{0.0835 \cdot 12}$   
 $A = 20427.92874$   
 $\boxed{\$20427.93}$

8.  $t = 30$   $r = 12\%$   $0.12$   $P = 15000$   
A.  $A = 15000e^{0.12(30)}$   
 $A = 548973.5167$   
 $\boxed{\$548,973.52}$   
B.  $A = 15000(1 + \frac{0.12}{4})^{4 \cdot 30}$

$$A = 520664.807$$

$$\boxed{\$520,664.81}$$

The account using continuous compounding accrues  $\$28,308.71$  more money

9. triple money  $r=0.07$

~~30000~~

$$3 = 1 e^{0.07x}$$

$$\ln 3 = \ln e^{0.07x}$$

$$\ln 3 = 0.07x$$

$$x = \frac{\ln 3}{0.07} = 15.69$$

15.69 years

12.  $P=6$   $r=0.017$   $t=10$

$$A = 6e^{0.017(10)}$$

$$A = 7.11829108$$

7.11 billion

10.  $r=?$   $P=6000$   $A=11000$

$$t=8$$

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$$11000 = 6000 e^{r \cdot 8}$$

$$11/6 = e^{8r}$$

$$\ln 11/6 = \ln e^{8r}$$

$$\ln 11/6 = 8r$$

$$r = \frac{\ln 11/6}{8}$$

$$r = 0.07576697$$

7.58%

11.  $t=?$  double  $r=0.06$

$$n=2$$

$$2 = 1 \left(1 + \frac{0.06}{2}\right)^{2t}$$

$$2 = (1.03)^{2t}$$

$$\ln 2 = \ln (1.03)^{2t}$$

~~ln 2 = 2t ln 1.03~~

$$\ln 2 = 2t \ln 1.03$$

$$t = \frac{\ln 2}{2 \ln 1.03}$$

$$t = 11.72488613$$

11.72 years