

(1)

Assignment #9
Business MATH
Compound Interest
SOLUTIONS

P. 425 # 12, 16, 18, 24, 42, 44

12 $P = ?$ $r = 0.09 \rightarrow i = \frac{0.09}{4} = 0.0225$

$$\left. \begin{array}{l} m = 4 \\ t = 25 \end{array} \right\} n = 100$$

$$S = 100\,000$$

$$S = P(1+i)^n$$

$$100\,000 = P(1+0.0225)^{100}$$

$$P = \frac{100\,000}{(1.0225)^{100}} = \boxed{10806.08 \$}$$

16 $P = 8000$
 $r = 0.07$
 $t = 8$

$$\begin{aligned} S &= Pe^{rt} \\ &= 8000e^{(0.07)8} \\ &= 14005.38 \end{aligned}$$

$$\begin{aligned} I &= S - P = 14005.38 - 8000 \\ &= \boxed{6005.38 \$} \end{aligned}$$

18 $P = 8000$
 $r = 0.085$
 $t = 4.5$

$$\begin{aligned} S &= Pe^{rt} \\ &= 8000e^{(0.085)(4.5)} \\ &= \boxed{11727.56 \$} \end{aligned}$$

24 (a) $m = 4$
 $r = 0.084$

$$\begin{aligned} APY &= \left(1 + \frac{0.084}{4}\right)^4 - 1 \\ &= 0.0867 \quad \boxed{8.67\%} \end{aligned}$$

(b) $APY = e^r - 1$ $r = 0.10$
 $= e^{0.10} - 1$
 $= 0.1052 \quad \boxed{10.52\%}$

42 $P = 8000$
 $S = 15000$
 $m = 12$ } $i = \frac{0.09}{12}$ $t = \# \text{ YEARS}$
 $r = 0.09$

$$15000 = 8000 \left(1 + \frac{0.09}{12}\right)^{12t}$$

$$\frac{15000}{8000} = (1.0075)^{12t}$$

$$\ln\left(\frac{15000}{8000}\right) = \ln(1.0075)^{12t}$$

$$\ln(1.875) = 12t \ln(1.0075)$$

$$\frac{\ln(1.875)}{12 \ln(1.0075)} = t$$

$$t = 7.01$$

$\boxed{\text{Approx 7 years}}$

44

1st Investment

$$r = 0.07$$

$$t = 4$$

$$P = 1000$$

$$\begin{aligned} S &= P + I = P + Prt \\ &= 1000 + 1000(0.07)(4) \\ &= 1000 + 280 \\ &= 1280 \end{aligned}$$

2nd Investment

$$\left. \begin{array}{l} r = 0.07 \\ m = 4 \end{array} \right\} i = \frac{0.07}{4} = 0.0175$$

$$n = 4 \cdot 6 = 24$$

$$\begin{aligned} S &= 1280 (1 + 0.0175)^{24} \\ &= \boxed{1941.05 \$} \end{aligned}$$