Section 8.2

33 $P = 100 \qquad r = 0.06 \qquad t = 4$

a) $m = 1$

$$A = P\left(1 + \frac{r}{m}\right)^{mt}$$
$$= 100\left(1 + \frac{0.06}{1}\right)^{4}$$
$$= 100\,(1.06)^{4}$$
$$\approx \$126.25$$

Interest $I = A - P$
$$\approx 126.25 - 100$$
$$\approx \$26.25$$

b) $m = 4$

$$A = P\left(1 + \frac{r}{m}\right)^{mt}$$
$$= 100\left(1 + \frac{0.06}{4}\right)^{16}$$
$$= 100\,(1.015)^{16}$$
$$\approx \$126.90$$

Interest $I = A - P$
$$\approx 126.90 - 100$$
$$\approx \$26.90$$

33 c) $m = 12$

$$A = P\left(1+\frac{r}{m}\right)^{mt}$$
$$= 100\left(1+\frac{0.06}{12}\right)^{48}$$
$$= 100\,(1.005)^{48}$$
$$\approx 127.05$$

Interest $I = A - P$
$$\approx 127.05 - 100$$
$$\approx \$27.05$$

35 $P = 5000 \quad r = 0.05 \quad m = 12$

a) $t = 2$
$$A = P\left(1+\frac{r}{m}\right)^{mt}$$
$$= 5000\left(1+\frac{0.05}{12}\right)^{24}$$
$$\approx \$5524.71$$

b) $t = 4$
$$A = P\left(1+\frac{r}{m}\right)^{mt}$$
$$= 5000\left(1+\frac{0.05}{12}\right)^{48}$$
$$\approx \$6104.48$$

(37) $P = 8000 \quad r = 0.07 \quad t = 6$

Continuous Compounding

$$A = Pe^{rt}$$

$$= 8000\, e^{0.07(6)}$$

$$= 8000\, e^{0.42}$$

$$\approx \$12175.69$$

(43) $r = 0.06 \quad m = 2 \quad A = 10000$

a) $t = 5$

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

$$10000 = P\left(1 + \frac{0.06}{2}\right)^{10}$$

$$10000 = P(1.03)^{10}$$

$$\frac{10000}{1.03^{10}} = P$$

$$P = \frac{10000}{1.03^{10}}$$

$$P \approx \$7440.94$$

(43) b) $t = 10$

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

$$10000 = P\left(1 + \frac{0.06}{2}\right)^{20}$$

$$10000 = P(1.03)^{20}$$

$$\frac{10000}{1.03^{20}} = P$$

$$P = \frac{10000}{1.03^{20}}$$

$$P \approx \$5536.76$$

(45) $r = 0.09$ $\quad A = 25000$

a) 36 months = 3 years

$t = 3$

Continuous compounding

$$A = Pe^{rt}$$

$$25000 = Pe^{0.09(3)}$$

$$25000 = Pe^{0.27}$$

$$\frac{25000}{e^{0.27}} = P$$

$$P = \frac{25000}{e^{0.27}}$$

$$P \approx \$19084.49$$

(45) b) $t = 9$

Continuous Compounding

$$A = Pe^{rt}$$

$$25000 = Pe^{0.09(9)}$$

$$25000 = Pe^{0.81}$$

$$\frac{25000}{e^{0.81}} = P$$

$$P = \frac{25000}{e^{0.81}}$$

$$P \approx \$11121.45$$

(47) a) $r = 0.039 \quad m = 12$

$$APY = \left(1 + \frac{r}{m}\right)^m - 1$$

$$= \left(1 + \frac{0.039}{12}\right)^{12} - 1$$

$$\approx 0.0397 \quad \text{or} \quad 3.97\%$$

b) $r = 0.023 \quad m = 4$

$$APY = \left(1 + \frac{r}{m}\right)^m - 1$$

$$= \left(1 + \frac{0.023}{4}\right)^4 - 1$$

$$\approx 0.0232 \quad \text{or} \quad 2.32\%$$

(49) a) $r = 0.0515$

$APY = e^{r} - 1$ (continuous compounding)

$= e^{0.0515} - 1$

≈ 0.0528 or 5.28%

b) $r = 0.0520$ $m = 2$

$APY = \left(1 + \frac{r}{m}\right)^{m} - 1$

$= \left(1 + \frac{0.0520}{2}\right)^{2} - 1$

≈ 0.0527 or 5.27%

(61) $P = 20000$ $t = 17$ $r = 0.07$ $m = 4$

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

$= 20000\left(1 + \frac{0.07}{4}\right)^{4(17)}$

$= 20000\,(1.0175)^{68}$

$\approx \$65068.44$

(75) $P = 20000$ $r = 0.06$ $m = 365$ $t = 35$

(Note: We disregard leap years because the extra day every four years makes very little impact.)

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

$= 20000\left(1 + \frac{0.06}{365}\right)^{12775}$

$\approx \$163295.21$