QUIZ 10 ANSWERS.

7, page 130. Let $P$ be the monthly deposit. Then

$$5000 = P \frac{(1 + .05/12)^{10 \times 12} - 1}{.05/12}$$

$$5000 = P \times 240 \left((1 + 1/240)^{120} - 1\right)$$

Solving for $P$ gives $P \approx 32.199$. It follows that $\$32.20$ is the required payment.

Accuracy check. Note that $\$32.19$ will not earn enough, because

$$32.19 \left(1 + \frac{.05}{12}\right)^{120} - 1 \approx 4998.54,$$

and that $\$32.20$ will earn slightly more than needed, because

$$32.20 \left(1 + \frac{.05}{12}\right)^{120} - 1 \approx 5000.09.$$

19, page 130.

Joe’s amount = $3000 \left(1.098\right)^{30} - 1 \approx 475,172.09950$ .

$$\approx 475,172.10.$$

Jill’s amount = $57.69 \left(1 + \frac{.098}{52}\right)^{30 \times 52} - 1 \approx 546,822.419 .

$$\approx 546,822.42.$$

More frequent compounding earns more.

26, page 131. Let $t$ be the term (in years). Recall that

$$mt = \frac{\ln(1 + \frac{A}{P})}{\ln(1 + \frac{r}{m})} .$$

Thus

$$12t = \frac{\ln(1 + \frac{16000 \times .0573}{375})}{\ln(1 + \frac{.0573}{12})} .$$

Since $.0573/12 = .004775$ and $16000 \times .004775 = 76.4$, we have

$$12t = \frac{\ln(1 + 76.4/375)}{\ln(1.004775)} \approx 38.93 .$$

It follows that one should wait 39 monthly periods or 3 years and 3 months.
5, page 141. Directly by the formula,

\[
\text{present value} = 1400 \frac{1 - (1 + .069/12)^{-12 \times 30}}{.069/12}
\]

\[
= 1400 \frac{1 - (1.00575)^{-360}}{.00575}
\]

\[
= 212,572.07989\ldots
\]

\[
\approx 212,572.08
\]