QUIZ 8 ANSWERS.

5. A) Amount due = 12000\(1 + \left(\frac{0.75}{2}\right)^{4\cdot2+1}\) = 12000 \cdot 1.0375^9 \approx 16713.76.

5. B) Amount due = 12000\(1 + \left(\frac{0.75}{12}\right)^{4\cdot12+6}\) = 12000 \cdot 1.00625^{54} \approx 16799.62.

19. By the rule of 72, 

doubling time \approx \frac{72}{100 \cdot 0.09} = 72/9 = 8 \text{ years}.

A more careful calculation shows that 

t = \frac{\ln(2)}{\ln(1.09)} \approx 8.0432

and so the doubling time is actually 9 years.

33. Past value = 50000\(1 + \left(\frac{0.73}{52}\right)^{-17\cdot52}\) \approx 14467.34.

41. To collect 10 times the investment one needs \(t\) such that

\[
10 = \left(1 + \frac{0.07}{52}\right)^{52t}
\]

\[
\ln(10) = \left(1 + \frac{0.07}{52}\right)^{52t}
\]

\[
\ln(10) = 52t \ln \left(1 + \frac{0.07}{52}\right)
\]

\[
t = \frac{\ln(10)}{52 \ln \left(1 + \frac{0.07}{52}\right)} \approx 32.9162.
\]

Since .9162 years is about 47.6 weeks, the actual time period is 32 years and 48 weeks.

43. If one invests $1 for 1 year then The People’s State Bank would yield 
\((1 + \left(\frac{0.042}{4}\right)^4 \approx 1.0427\), while Statewide Federal would yield 
\((1 + \left(\frac{0.041}{365}\right)^{365} \approx 1.0418\). Hence the effective rate of interest offered by The People’s State Bank is higher: 4.27% against 4.18%.