IE2111 ISE Principles & Practice II
Solutions to Assignment #1

(*a*) Effective monthly interest rate = 0.09 / 12 = 0.0075 or 0.75%

(*b*) Effective annual interest rate $= \left(1+\frac{0.09}{12}\right)^{12} - 1$

$= 0.0938 = 9.38\%$

(*c*) Monthly payment amount = 80,000 [*A*/*P*, 0.75%, 36]
= 80,000 (0.031799733)
= **$ 2,543.98**

(*d*) Immediately after the 24th payment, Mary has 12 more monthly payments of $2,543.98 each to go. The balance she still owes the bank is the present equivalent value at the end of the 24th month, of the 12 more outstanding monthly payments.

Balance owed = 2,543.98 [*P*/*A*, 0.75%, 12]
= 2,543.98 (11.43491267)
= $ 29,090.17

(*e*) If Mary pays this balance over the next 24 months, new monthly payment amount

= 29,090.17 [*A*/*P*, 0.75%, 24]
= 29,090.17 (0.045684742)
= **$ 1,328.98**

(*f*) Charlie can afford to pay $3,546 per month, the number of months to pay for the $80,000 at an interest rate of 0.5% per month compounded monthly is *N* such that:

$$80{,}000\ [A/P,\ 0.5\%,\ N] = 3{,}546$$

$$80{,}000\left(\frac{0.005(1+0.005)^N}{(1+0.005)^N - 1}\right) = 3{,}546$$

Using any equation solver: $N = 24$ months

Hence Charlie will require approximately 24 months to pay back the loan.