

Name (print neatly):

KEY

Score: _____ /20

Quiz 8: Thursday, March 12, 2015

To receive full credit, show all work necessary to justify answers and all steps of proofs and derivations clearly, in logical sequence, using notation developed in class. Partial credit will be given only for significant progress toward a solution.

1. A loan of \$5000 is to be repaid with installment payments of \$ R at the end of every quarter for 10 years. The rate of interest charged on the loan is 6% convertible monthly.

- (a) Find j , the equivalent effective rate of interest per quarter.

Given $i^{(12)} = 0.06$, find the effective quarterly rate j .

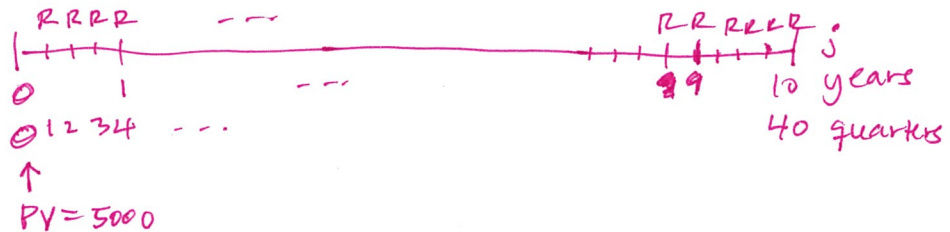
$$1+j = \left(1 + \frac{i^{(12)}}{12}\right)^3 \leftarrow 1 \text{ quarter} = 3 \text{ months}$$

$$j = \left(1 + \frac{0.06}{12}\right)^3 - 1$$

$$j = 1.005^3 - 1$$

$$j = 0.015075125 \dots$$

- (b) Find the quarterly payment R .



$$R a_{\overline{40}|j} = 5000$$

$$R = \frac{5000}{a_{\overline{40}|j}}$$

$$= \frac{5000}{\frac{1 - (1+j)^{-40}}{j}}$$

$$= \frac{5000 j}{1 - (1+j)^{-40}}$$

$$= \$167.36$$