

Problem Set 3

a) Loan 1

$$PV = 400,000$$

$$r = 4.25\%$$

$$n = 360$$

$$PMT = -\$1967.7596$$

$$PMT = -\$1967.7596$$

$$PV = 400,000 - 2000 = 398,000$$

$$n = 360$$

$$r = 4.2922\%$$

Loan 2

$$PV = 400,000$$

$$r = 4\%$$

$$n = 360$$

$$PMT = -\$1909.6612$$

$$PMT = -\$1909.6612$$

$$PV = 400,000 - 2000 - .00979(400,000) \\ = 394,109$$

$$n = 360$$

$$r = 4.1234\%$$

Loan 3.

$$PV = 400,000$$

$$r = 3.875\%$$

$$n = 360$$

$$PMT = -\$1880.9983$$

$$PMT = -\$1880.9983$$

$$PV = 400,000 - 2000 - .025(400,000) \\ = \$388,000$$

$$n = 360$$

$$r = 4.1273\%$$

b) Loan 1

Calculate remaining balance after 5 years

$$PMT = -\$1967.7596$$

$$n = 360 - 60 = 300$$

$$r = 4.25$$

$$PV = -\$363,230.793$$

Effective rate over 60 months

$$PV = 398,000$$

$$n = 60$$

$$PMT = -\$1967.7596$$

$$FV = -\$363,230.793$$

$$r = 4.3664\%$$

Loan 2

$$PMT = -\$1909.6612$$

$$r = 4\%$$

$$n = 300$$

$$PV = \$361,790.056$$

Effective Rate

$$PV = 399,104$$

$$n = 60$$

$$PMT = -\$1909.6612$$

$$PV = \$361,790.056$$

$$r = 4.3435\%$$

Loan 3

$$PMT = -\$1880.9983$$

$$r = 3.875$$

$$n = 300$$

$$PV = \$361,054.6709$$

Effective Rate

$$PV = 388,000$$

$$n = 60$$

$$PMT = -\$1880.9983$$

$$FV = -\$361,054.6709 - .02(400,000) = -\$369,054.6709$$

$$\boxed{r = 4.9548\%}$$

C) Loan 2 has a slightly lower rate than Loan 3, and is lower than Loan 1.

D) Loan 2 is still the best option, by a greater amount.