Math 1320
Instructor: C. Mundy-Castle
Fall '14

NAME KEY

Exam 2

October 21st, 2014

#1	/20
#2	/20
#3	/20
#4	/20
#5	/20
Grade	/100

You may use a calculator and a formula sheet on this exam. **Wherever necessary, you must show all of your work to receive full credit for a problem.**

3) Carlos received an inheritance of $30,000 and would like to invest it in an account that pays 6.2% interest, compounded quarterly. He would like to eventually have $34,000 to use as a down payment on a house. How long will it take until he has the money he wants? Round your answer to the nearest year.

Use $FV = PV\left(1 + \frac{r}{m}\right)^{mt}$

$34000 = 30000\left(1 + \frac{0.062}{4}\right)^{4t}$

$\frac{17}{15} = 1.0155^{4t}$

$\ln\left(\frac{17}{15}\right) = \ln\left(1.0155\right)^{4t} \rightarrow \ln\left(\frac{17}{15}\right) = 4t\ln(1.0155)$

$t = \frac{\ln\left(17/15\right)}{4\ln(1.0155)} = 2.034$

About 2 years.

4) Your pension plan is an annuity with a guaranteed return of 4.7% per year, compounded quarterly. You would like to retire with a pension of $12,000 per quarter for 20 years. If you work for 30 years before retiring, how much must you deposit each quarter into the fund in order to meet your goal? Round to the nearest dollar.

Use $PV = PMT \dfrac{1-\left(1+\frac{r}{m}\right)^{-mt}}{r/m}$

$PV = 12000 \dfrac{1-\left(1+\frac{0.047}{4}\right)^{-4(20)}}{0.047/4} = 620145.50$

Then use $PMT = FV \dfrac{r/m}{\left(1+\frac{r}{m}\right)^{mt}-1}$

$PMT = 620145.50 \dfrac{\frac{0.047}{4}}{\left(1+\frac{0.047}{4}\right)^{4(30)}-1} = 2379.39$

2379

5) You are expecting a tax refund of $4,000 in 4 weeks. A tax preparer offers you an "interest-free" loan of $4,000 for a fee of $50 to be repaid by your refund check when it arrives in 4 weeks. Thinking of the fee as interest, what simple interest rate would you be paying on this loan?

$INT = PVrt$

$50 = 4000r\left(\frac{4}{52}\right) \rightarrow \qquad 50 = \frac{4000}{13} \cdot r$

$r = 50 \cdot \left(\frac{13}{4000}\right) = 0.1625$

16.25 %