Math 1320 Quiz Name KEY

You may use a calculator and your homework, but not your books or notes. There are two problems worth 10 points each. **Show all of your work to receive full/partial credit.**

1) (#21 from 2.3) Find the periodic withdrawals for an annuity with $75,000 at 4% interest, paid out quarterly for 20 years.

Use $PMT = PV\dfrac{i}{1-(1+i)^{-n}}$ $\quad i = \frac{r}{m}$, $n = mt$

$$PMT = 75000\,\frac{0.04/4}{1-\left(1+\frac{0.04}{4}\right)^{-4(20)}} = \$1366.41$$

2) (#43 from 2.3) Your pension plan is an annuity with a guaranteed return of 3% per year (compounded monthly). You would like to retire with a pension of $5,000 per month for 20 years. If you work 40 years before retiring, how much must you and your employer deposit each month into the fund?

First, find present value of an annuity with #5,000 monthly payments for 20 years

$$PV = PMT\,\frac{1-(1+i)^{-n}}{i} = 5000\,\frac{1-\left(1+\frac{0.03}{12}\right)^{-12(20)}}{\frac{0.03}{12}} = \#901{,}554.57$$

Then, find the payments required to pay into a sinking fund in order to have #901,554.57 in 40 years

$$PMT = FV\,\frac{i}{(1+i)^{n}-1}$$

$$PMT = 901{,}554.57\,\frac{\frac{0.03}{12}}{\left(1+\frac{0.03}{12}\right)^{12(40)}-1} = \#973.54$$

You should deposit #973.54 each month into the fund.