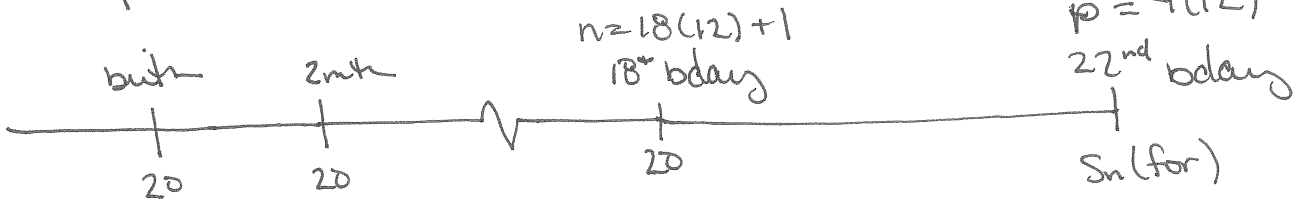
Chapter 5 - Problems

1)



$i = \left(\left(1+\frac{.08}{4}\right)^{\left(\frac{4}{12}\right)} - 1\right)100 = .662270956\%$ per month

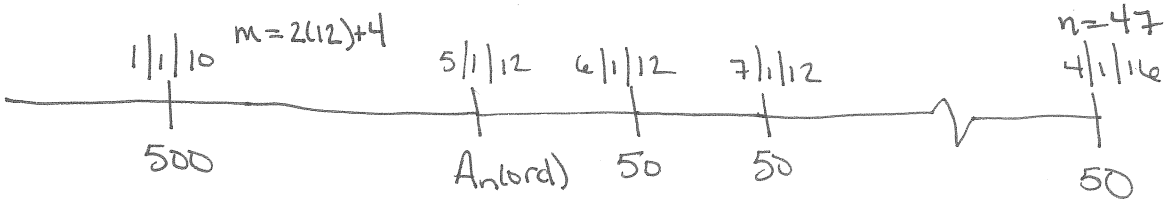
$S_n(for) = R\, s_{\overline{n}|i}\, (1+i)^p$

$= 20\, s_{\overline{271.6622...}|\%}\, (1+.006622...)^{48}$

$= 9629.588525\, (1+.006622...)^{48}$

$= \boxed{\$13,219.36}$

2)



$i = \left(\left(1+\frac{.05}{4}\right)^{\frac{4}{12}} - 1\right)100 = .411494251234\%$ per month

$A_n(ord) = A_n(due)\,(1+i)^m$

$= 500\,(1+.00414...)^{28} = 561.4662236$

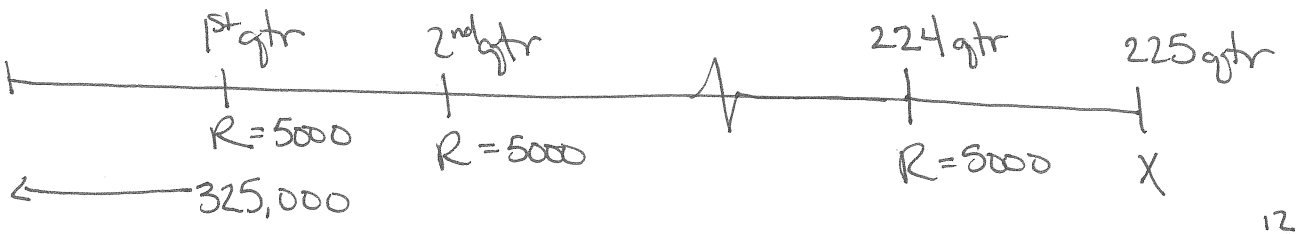
$S_n(ord) = R\, s_{\overline{n}|i} = 50\, s_{\overline{47}|.414...\%} = 2588.896268$

Value on 4/1/16 $= 561.4662236\,(1+i)^{47} + S_n(ord)$

$= 682.0964 + 2588.8962$

$= \boxed{\$\ 3270.99}$

3)



$A_n(ord) = A_n(due)(1+i)^{-1}$

$= 325{,}000(1+.015075\ldots)^{-1}$

$= 320{,}173.3468$

$= 5000\, a_{\overline{n}|1.5075\ldots}$

$i = \left(\left(1+\frac{.06}{12}\right)^{\frac{12}{4}} - 1\right)(100)$

$= 1.50751125\%$ per quarter

$n = 224.686$

Value after 224th full stipend

$= 3389.243925$

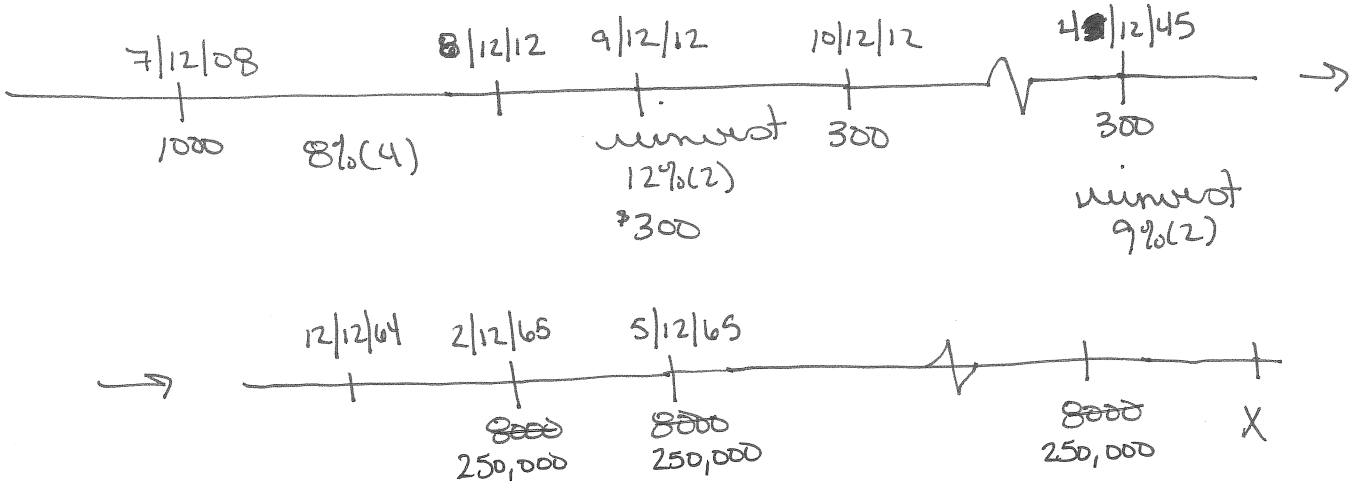
Value at 225th period

$= 3389.243925(1+.015075\ldots)$

$= 3440.337201$

224 full quarterly stipends with a final stipend of \$3440.34

4)



$i = \left(\left(1+\frac{.08}{4}\right)^{\frac{4}{12}} - 1\right)100 = .662270956\%$ per month

7/08 to 9/12
= 4 yrs 2 mth
$n = 4(12) + 2$
$= 50$

$A_{n\,(due)} = 1000\,(1+.0066\ldots)^{50} = 1391.029038$

Change interest rate

$i = \left(\left(1+\frac{.12}{2}\right)^{\frac{2}{12}} - 1\right)100 = .975879417\%$ per month

$A_{n\,(ord)} = A_{n\,(due)}\,(1+i)^{-1}$

$= 1391.029038\,(1+.009758\ldots)^{-1}$

$= 1377.585465$

9/12 to 4/45
= 32 yrs 7 mth
$n = 32(12) + 7 + 1$
$= 392$

Value after 392nd pmt on 4/12/45

$= 1377.585465(1+.00975\ldots)^{392} + 300\,s_{\overline{392}|.975\ldots\%}$

$= 1,414,963.692$

4/45 to 12/64
= 19 yrs 8 mth

Value on 12/12/64 $= 1,414,963.692\,(1+.007363\ldots)^{236}$

$= 7,991,949.302$

Change interest rate

$i = \left(\left(1+\frac{.09}{2}\right)^{\frac{2}{12}} - 1\right)100 = .736312302\%$ per month

$i = \left(\left(1+\frac{.09}{2}\right)^{\frac{2}{4}} - 1\right)100 = 2.225241501\%$ per qtr

$A_{n\,(ord)} = R\,a_{\overline{n}|i}$

$7,991,949.302 = 8000\,a_{\overline{n}|2.22\ldots\%}$

$n = \infty$

observe
\$8000 pmts
∠ the payments
in perpetuity

Note: in perpetuity

$R = A_{\infty}\,i = 7,991,949.302\,(.022252415 01)$

$= \$180,011.87$

$A_n(ord) = R a_{\overline{n}|i}$ $\quad n = 56.459$

$7,991,949.302 = 250,000\ a_{\overline{n}|2.22...\%}$

$R s_{\overline{n}|i} = 250,000\ s_{\overline{57}|2.22...\%} = \$134,535.20$

56 full payments and a final pmt of

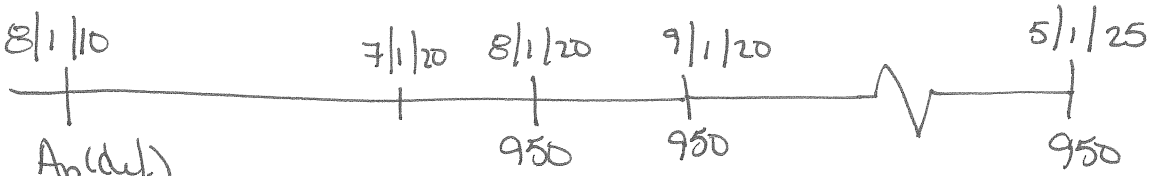
$250,000 - 134,535.20 = \$115,464.80$

In perpetuity:

$R = A_\infty i = 7,991,949.302\,(.022252241501)$

$= \$180,011.87$

5).



9.5%(1) An(def)

$An(def) = An(ord)(1+i)^{-119}$

$= R a_{\overline{n}|i}(1+i)^{-119}$

$= 950\, a_{\overline{58}|.75915...\%}(1+.00759...)^{-119}$

$= 44{,}435.87508(1+.00759...)^{-119}$

$= 18{,}066.62605$

$= \boxed{\$18{,}066.63}$

$i = ((1+.\frac{095}{1})^{\frac{1}{12}} - 1)100$

$= .7591534291\%$ per month

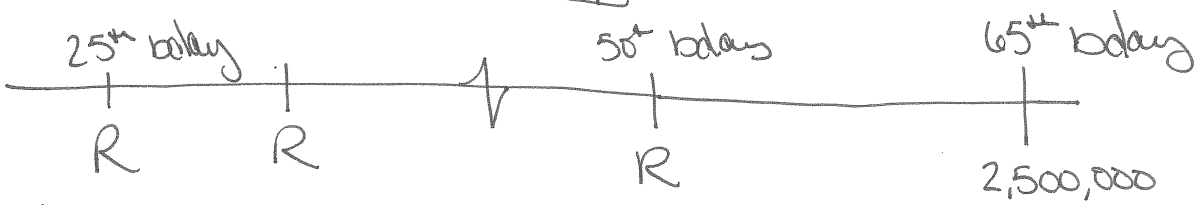
8/10 to 7/20 = 9 yrs + 11 mths

$m = 9(12)+11 = 119$

8/20 to 5/25 = 4 yrs 9 mth

$n = 4(12)+9+1 = 58$

6).



$i = ((1+.\frac{10}{4})^{\frac{4}{12}} - 1)100$

$= .8264837609\%$ per month

$n = 25(12)+1 = 301$

$Sn(ord) = 2{,}500{,}000(1+.00826...)^{-180}$

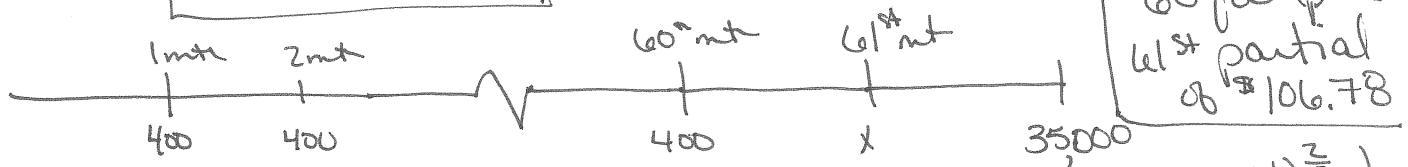
$= 568{,}208.9697$

$p = 15(12) = 180$

$= R s_{\overline{n}|i} = R s_{\overline{301}|.8264...\%}$

$\boxed{R = \$430.39}$

7).



60 full pmts
61st partial of $106.78

$Sn(ord) = 35{,}000(1+.01134...)^{-1} = 34{,}607.54148$

$= R s_{\overline{n}|i} = 400 s_{\overline{n}|1.134...\%}$

$i = ((1+.\frac{14}{2})^{\frac{2}{12}} - 1)100$

$= 1.134026013\%$ per month

$n = 60.628$ $S_{40} = 400 s_{\overline{40}|1.13...\%} = 34{,}113.90377$

$X = 34{,}607.54148 - 34{,}113.90377(1+.0113...) = 106.77717$