

**Problem B4** Supplemental Problem Ch. 7 Net Present Worth & Annuity

**Goal:** Present Worth comparison of investments

**Given:** Time Value of money interest rate 0.053

	<b>A</b>	<b>B</b>
Investment	\$10,000	\$10,000
Income	\$43,000	\$5,400 per year
	7	7

**Approach:** Determine present worth of each cash flow scenario

investment "A" is single amount in future so discount  $P = F/(1+i)^n$   
 Subtract initial investment to determine NPV of alternative

investment "B" is uniform annual amounts = annuity so present worth of annuity  $P = A [ ((1+i)^n - 1) / (i(1+i)^n) ]$   
 Subtract initial investment to determine NPV of alternative

Largest NPV is best alternative

**Calculations:**

Present Worth of Investment A cash flow      \$29,955.04       $=E8/((1+F5)^E9) = F/(1+i)^n = \$43,000/(1+0.053)^7$

**Answer (a)** NPV investment A      **\$19,955**       $=-E7+E8/((1+F5)^E9) = -I_0+F/(1+i)^n = -\$10,000+\$43,000/(1+0.053)^7$

Present Worth of Investment B cash flow      \$30,909.52       $=G8*(((1+F5)^G9)-1)/(F5*(1+F5)^G9) = A* [ ((1+i)^n - 1)/(i(1+i)^n) ]$   
 $= \$5,400* [ ((1+0.053)^7 - 1)/(0.053*(1+0.053)^7) ]$

**Answer (b)** NPV investment B      **\$20,910**       $=-G7+G8*(((1+F5)^G9)-1)/(F5*(1+F5)^G9) = -I_0 + A* [ ((1+i)^n - 1)/(i(1+i)^n) ]$   
 $= -\$10,000 + \$5,400* [ ((1+0.053)^7 - 1)/(0.053*(1+0.053)^7) ]$

**Discussion:** Alternative **B** is superior      \$954.49