

Section/Lesson Title: ANNUITIES

Materials: WS

HW#

S.4 WS

Reflections:

ANNUITIES

— AN ACCOUNT IN WHICH MONEY IS DEPOSITED ON A PERIODIC BASIS (LIKE MONTHLY), RATHER THAN JUST A ONE-TIME LUMP SUM

EXAMPLE: You deposit \$100 into an account that pays 1) 2% ANNUAL INTEREST, COMPOUNDED MONTHLY. WHAT DO YOU HAVE AT THE END OF 4 MONTHS?

1st \$100 → IN FOR 3 MONTHS INTEREST:  $100 \left(1 + \frac{.02}{12}\right)^3$

2nd \$100 → IN FOR 2 MONTHS INTEREST:  $100 \left(1 + \frac{.02}{12}\right)^2$

3rd  $\longrightarrow$   $100 \left(1 + \frac{.02}{12}\right)^1$

4th  $\longrightarrow$  100

$$\$100 + 100 \left(1 + .01\right) + 100 \left(1 + .01\right)^2 + 100 \left(1 + .01\right)^3 = \$406.04$$

GEOMETRIC SUM  $\hat{=}$   $a_1 \left(\frac{1-r^n}{1-r}\right)$

WE REARRANGE IT A BIT TO ACCOUNT FOR SLIGHTLY DIFFERENT VARIABLES  $\hat{=}$

$$S = PMT \left[ \frac{(1+r)^n - 1}{r} \right]$$

S = FINAL AMT (SUM)

PMT = PAYMENT AMT

r = PERIODIC RATE

n = # OF DEPOSITS

\$100 FOR 20 YEARS AT 6% COMPOUNDED MONTHLY

$$S = 100 \left[ \frac{\left(1 + \frac{.06}{12}\right)^{20(12)} - 1}{\left(\frac{.06}{12}\right)} \right] = \$46,204.09$$