Changing Conditions on Investments & Loans

Terminology: **TERM** – The length of time that an investment is held or a loan is carried.

Some Truths About Interest

1. The higher the interest rate, the MORE interest earned/paid
2. The longer the term of an investment or loan the MORE interest earned/paid
3. The more frequent the compounding period, the FASTER interest accrues (grows)
4. For simple interest, doubling an interest rate or term DOUBLES the total interest. This is because simple interest growth is constant over time.
5. For compound interest, doubling an interest rate or term more than doubles the total interest. This is due to the effects of compounding.

EXAMPLE: CHANGING INTEREST RATES AND COMPOUNDING PERIODS

Joakim would like to have $8 000 in 5 years. Determine the amount he would need to invest at each rate to reach his goal.

a) 6% per year, compounded quarterly
b) 5.2% per year, compounded monthly
c) 4.8% per year, compounded weekly

6% compounded quarterly

$A = 8\,000$

$P = ?$

$i = 0.06 \div 4 = 0.015$

$n = 5 \text{ years} \times 4 = 20$

$P = A(1+i)^{-n}$
$= 8000(1+0.015)^{-20}$
$= 5939.76$

∴ He needs to invest $5939.76

5.2% compounded monthly

$A = 8\,000$

$P = ?$

$i = 0.052 \div 12 = 0.0043$

$n = 5 \times 12 = 60$

$P = A(1+i)^{-n}$
$= 8000(1+0.0043)^{-60}$
$= 6184.18$

∴ He needs to invest $6184.18

4.8% compounded weekly

$A = 8\,000$

$P = ?$

$i = 0.048 \div 52$

$n = 5 \times 52 = 260$

$P = A(1+i)^{-n}$
$= 8000(1+0.048 \div 52)^{-260}$
$= 6293.72$

∴ He needs to invest $6293.72