Unit 8: Financial Applications

Day 5: Solving Financial Problems

Today we will...

1. Solve financial problems involving present and future value, interest rate and time.

MCF3MI: **Unit 8: Financial Applications** **Day 5: Solving Financial Problems**

Example 1: Paula's employer has loaned her $6500 to pay for a university course tuition and textbooks. The interest rate of the loan is 2.75% /a compounded monthly, and the loan is to be paid back at the end of 2 years. How much will Paula have to pay back?

P

$A = P(1+i)^n$

$= 6500(1.00229166)^{24}$

$= 6867.08$

$i = \frac{0.0275}{12} = 0.00229166$

$n = 2 \times 12 = 24$

∴ She has to pay back $6867.08

Example 2: How much was invested at 6.5% compounded quarterly for 4 years if the final amount was $8 500?

$P = \frac{A}{(1+i)^n}$

$= \frac{8\,500}{(1.01625)^{16}} = \$6567.65$

∴ $6567.65 was invested

VA

$i = \frac{0.065}{4}$

$i = 0.01625$

$n = 4 \times 4 = 16$

Example 3: What annual interest rate was charged if a $500 credit card bill grew to $620.56 in 6 months and interest was compounded monthly?

$A = P(1+i)^n$

$\frac{620.56}{500} = \frac{500(1+i)^6}{500}$

$1.24112 = (1+i)^6$

# of comp periods

$\sqrt[6]{1.24112} = 1+i$

$1.03 66583 = 1+i$

$0.0366583 = i$ ← Rate per comp period.

$0.0366583 \times 12 =$ Annual Rate.

0.439989

∴ Annual Rate was 44%.

Example 4: Approximately how long would it take for a $12 000 investment to double if it earns 7.5% /a compounded semi-annually?

$A = P(1+i)^n$

$\frac{24\,000}{12\,000} = \frac{12\,000(1+0.0375)^n}{12\,000}$

$2 = (1.0375)^n$ → TRIAL & ERROR:

$i = \frac{0.075}{2}$

$i = 0.0375$

Homework: pg. p. 487 – 488 #2, 3, 4b, 5abdef, 6, 7, 8, 9

$1.0375^{15} = 1.73$

$1.0375^{18} = 1.94$

$1.0375^{18.8} = 1.997$

$1.0375^{18.9} = 2.003$

$1.0375^{19} = 2.012$

$1.0375^{20} = 2.088$

$18.8 \div 2 \rightarrow$ years

9.4 years

$2^{+0.4}$

∴ It takes 9 years and 5 months to double