ST. JEAN DE BREBEUF MATHEMATICS

CHAPTER 8.3
PRESENT VALUE

KEY CONCEPTS

The **Present Value** is used to calculate the *Principal* amount for any loan or investment

When dealing with word problems, there are several "buzz words" that indicate that the *Present Value* formula should be used to solve it. Words include:
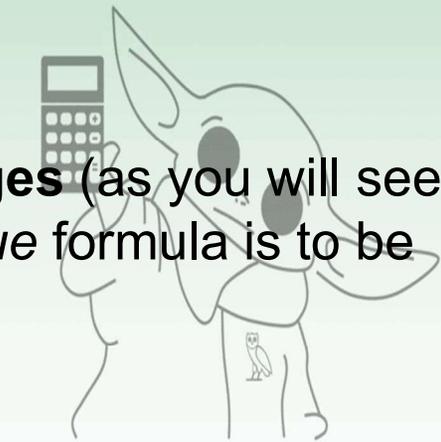
      "**Today**"
      "**Immediately**"
      "**Right away/right now**"
      "**Discount**"

*** Also, any problems dealing with **loans** and **mortgages** (as you will see more of in Grade 12) also indicate that the *Present Value* formula is to be used
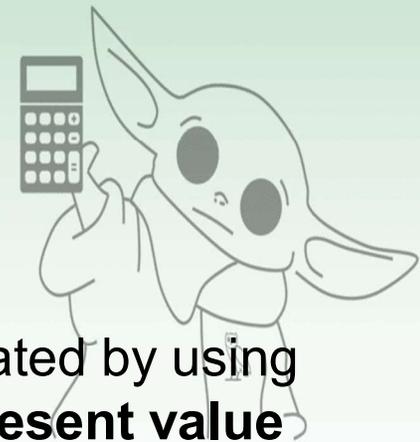
KEY CONCEPTS

FORMULA

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

P = Principal amount (or *Present Value*)

A = Final amount (or *Future Value*)

i = Interest rate *per compounding period,* where

$$i = \frac{r}{N} \quad \text{or} \quad i = \frac{Interest\ rate\ per\ year}{\#of\ compounding\ periods\ per\ year}$$

n = *Total # of compounding periods* where **n = yN** or

n = # of years × # of compounding periods per year

Interest or **savings** from a present value can be calculated by using
Interest/Savings = Final amount – Present value
or **I = A – P**

EXAMPLE 1   Investments

Chantelle is a Grade 9 student aspiring to be a doctor. She wants to invest enough money <u>today</u> to have **$5000** for first-year tuition when she goes to university in **four years**. If she invests her money at **6%** per year, **compounded monthly**, how much does she need to invest <u>today</u>?

6 / 100

= **0.06**

A = **5000**

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

i = r / N

$$P = 5000(1+0.005)^{-48}$$

= 0.06 / 12

$$P = 5000(1.005)^{-48}$$

= **0.005**

$$\boxed{P = \$3935.49}$$

Represents *monthly* compounding

n = yN

Chantelle needs to invest **$3935.49** today in order to have $5000 in four years.

= 4(12)

= **48**

EXAMPLE 2   *Discounted Price*

Jonas purchased a laptop from *Best Buy* valued at **$1700** and the payment plan offered consists of regular payments for **three years**. The retailer is willing to discount the price of the computer at an interest rate of **8%** per year, **compounded semi-annually** if Jonas pays for it today.   8 / 100

                   = **0.08**

(a) **How much** will the retailer be willing to accept today?

A = **1700**

i = r / N

   = 0.08 / 2 ←

   = **0.04**   Represents *semi-annual* compounding

n = yN

   = 3(2)

   = **6**

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

$$P = 1700(1+0.04)^{-6}$$

$$P = 1700(1.04)^{-6}$$

$$\boxed{P = \$1343.53}$$

The retailer will accept **$1343.53** if Jonas pays for it today (this is a **discounted price**)

EXAMPLE 2 *Discounted Price*

Jonas purchased a laptop from *Best Buy* valued at **$1700** and the payment plan offered consists of regular payments for **three years**. The retailer is willing to discount the price of the computer at an interest rate of **8%** per year, **compounded semi-annually** if Jonas pays for it today.   8 / 100
= **0.08**

$$P = \$1343.53$$

(b) How much **interest** is Jonas *saving* by paying for it right now?

$$I = A - P$$
$$I = 1700 - 1343.53$$
$$I = \$356.47$$

Jonas will be saving **$356.47** if he pays for the computer right now.

CHAPTER 8.3 PRESENT VALUE

Homework:

Page 439 – 441
#1 – 13

CABILAN MATH ONLINE.COM