

2-8 Present Value of Investments

How can you determine what you need to invest NOW to reach a future financial goal?

- You need to start now to plan for large expenses in the future.
- It helps to know how much you need to save now or on a regular basis in order to meet your future financial goals.



AIR CONDITIONING

Example 1 – Present Value of a single deposit investment

- Mr. and Mrs. Johnson know that in 6 years, their daughter Ann will attend State College. She will need about \$20,000 for the first year's tuition. How much should the Johnsons deposit into an account that yields 1.5% interest, compounded annually, in order to have that amount?

- SOLUTION:

- $P = ?$ $r = 1.5\% = .015$ $t = 6$ $A = \$20,000$ $n = 1$ compounded annually

- $A = P(1 + r)^n$ \longrightarrow $20,000 = P\left(1 + \frac{.015}{1}\right)^{(1 * 6)}$

- $20000 = P * 1.09$ divide both sides of equation by 1.09

- $P = \$18,290.84$ **They must deposit \$18,290.84 NOW to have \$20,000 for college.**

Present Value of a periodic deposit investment Formula

$$A = \frac{P \left(\left(\left(1 + \frac{r}{n} \right)^{nt} \right) - 1 \right)}{\left(\frac{r}{n} \right)}$$

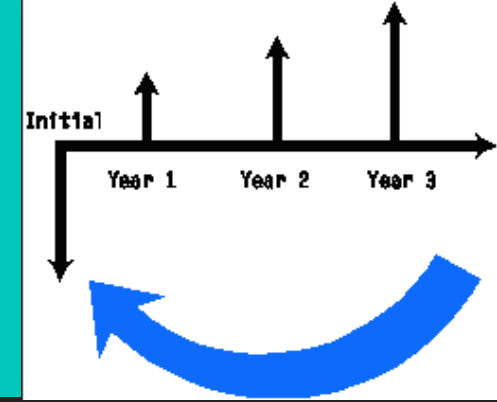
A = ending amount P = periodic deposit amount

r = rate as a decimal

t = time

n = number of deposits per year

Example 2 – Present Value of a periodic deposit investment



- Nick wants to install central air conditioning in his home in 3 years. He estimates the total cost to be \$15,000. How much must he deposit monthly into an account that pays 1.4% interest, compounded monthly, in order to have enough money? Round up to the nearest hundred dollars.

○ SOLUTION:

○ $n = 12$ $r = 1.4\% = .014$ $A = 15,000$ $n = 12$ (monthly) $t = 3$ years

Example 2 – SOLUTION continued

○ $n = 12$ $r = 1.4\% = .014$ $A = 15,000$ $n = 12$ (monthly) $t = 3$ years

○ Use the Present Value of a periodic deposit investment Formula

○
$$A = \frac{\left(\left(\left(1 + \frac{r}{n} \right)^{nt} \right) - 1 \right)}{\left(\frac{r}{n} \right)}$$
 $15000 = \frac{\left(\left(\left(1 + \frac{.014}{12} \right)^{(12 * 3)} \right) - 1 \right)}{\left(\frac{.014}{12} \right)}$

○ $15000 = P (36.745)$

divide both sides of equation by 36.745

○ $P = \$408.22$

○ To have \$15,000 for his air conditioner in 3 years, **Nick must save \$408.22 each month.**

Assignment: pg 119 #6 & 8

○ #6

Mary wants to go on a \$10,000 vacation in 6 months. She has a bank account that pays 4.25% interest, compounded monthly. How much must she deposit each month to afford the vacation?

○ #8

Suni needs to repay her school loan in 4 years. How much must she semiannually deposit into an account that pays 0.9% interest, compounded semiannually, to have \$100,000 to repay the loan?