

Are there any Homework Questions you would like to see on the board?

Study for the Unit 7 Summative!! (on Wed.)

p. 452 # 5 – 10, 13

Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) Identify the difference between simple and compound interest.
- b) State the formula for simple interest.
- c) Calculate simple interest.

Date: May 29/18**Simple Interest**

vs.

Compound Interest

$$A = P + I$$

where $I = Prt$

$$I = Prt$$

$$A = P + I$$

$$= P + Prt$$

$$A = P(1 + rt)$$

$$P = \frac{A}{(1 + rt)}$$

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

 I =Interest (\$Value) P =Principal (\$Value) r =rate of interest (as a **decimal**) t =time (in **years**) A =Amount (\$Value) at the end i =interest **per compounding period** n =number of **compounding periods**Ex. 1: You invest \$2000 @ $6\frac{1}{2}\%$ ^{per annum (per year)} simple interest for 4 years.

a) Calculate the interest you will earn.

$$I = ?$$

$$I = Prt$$

$$P = 2000$$

$$= (2000)(0.065)(4)$$

$$r = 6.5\% \\ = 0.065$$

$$= \$520$$

$$t = 4$$

 \therefore the interest is \$520.

b) How much will the investment be worth at the end of the term?

$$A = P + I$$

$$= 2000 + 520$$

$$= 2520$$

the investment is worth \$2520 at the end of two years.

Ex. 2: Your credit card has an annual interest rate of 26.99%.

You have a credit card balance of \$475 that was 25 days overdue.

Calculate the interest you have to pay?

$$I = ?$$

Simple

$$I = Prt$$

$$P = 475$$

$$= 475(0.2699)\left(\frac{25}{365}\right)$$

$$r = 26.99\% \\ = 0.2699$$

$$= 8.780$$

$$= \$8.78$$

$$t = \frac{25}{365}$$

you must pay \$8.78 in interest.

Ex. 3: Three years ago, Stewie lent Peter money.

Peter repaid Stewie a total of \$1700, which included simple interest charged at 16%/a. Calculate the original amount that Peter borrowed.

$$\begin{aligned}
 I &= ? & A &= 1700 & I &= P r t & A &= P(1 + r t) \\
 P &= ? & A &= P + I & & & 1700 &= P(1 + (0.16)(3)) \\
 r &= 16\% & &= P + P r t & & & &= P(1 + 0.48) \\
 &= 0.16 & A &= P(1 + r t) & & & 1700 &= P(1.48) \\
 t &= 3 & \frac{A}{(1 + r t)} &= P & & & \frac{1700}{1.48} &= \frac{1700}{1.48} \\
 & & & & & & P &= 1148.648 \\
 & & & & & & &= \$1148.65
 \end{aligned}$$

three years ago, Peter borrowed \$1148.65 from Stewie.

Ex. 4: Compound Interest

$$r = 0.062$$

You invest \$750 for 4 years at 6.2%/a compounded annually.

Determine the amount of interest it will have earned at maturity.

$$\begin{aligned}
 I_1 &= P_1 r t & I_2 &= P_2 r t & & \text{"Long way" on next screen.} \\
 &= 750(0.062)(1) & &= (796.50)(0.062)(1) & A &= P(1 + i)^n \\
 &= 46.50 & &= 49.383 & A &= ? & A &= 750(1 + 0.062)^4 \\
 A_1 &= P_1 + I_1 & &= 49.38 & P &= 750 & &= 750(1.062)^4 \\
 &= 750 + 46.50 & A_2 &= P_2 + I_2 & i &= 0.062 & n &= 4 \\
 &= 796.50 & &= 796.50 + 49.38 & & & &= 954.024 \\
 & & &= \$845.88 & & & &= \$954.02 \\
 & & & & I &= A - P \\
 & & & & &= 954.02 - 750 \\
 & & & & &= \$204.02
 \end{aligned}$$

the investment will have earned \$204.02 in interest.

Why not $I = P r t$ for 4 years?

$$\begin{aligned}
 I &= 750(0.062)(4) \\
 &= \$186.00
 \end{aligned}$$

Ex. 4: Compound Interest

You invest \$750 for 4 years at 6.2%/a compounded annually.

Determine the amount of interest it will have earned at maturity.

"Long way".

$$\begin{aligned} I_1 &= P \cdot r \cdot t \\ &= (750)(.062)(1) \\ &= 46.50 \end{aligned}$$

$$A_1 = 796.50$$

$$\begin{aligned} I_2 &= (796.50)(0.062)(1) \\ &= 49.38 \end{aligned}$$

$$A_2 = 845.88$$

$$\begin{aligned} I_3 &= (845.88)(0.062)(1) \\ &= 52.44 \end{aligned}$$

$$A_3 = 898.32$$

$$\begin{aligned} I_4 &= (898.32)(0.062)(1) \\ &= 55.70 \end{aligned}$$

$$A_4 = 954.02$$

→ Total Interest

$$= 46.50 + 49.38 + 52.44 + 55.70$$

$$= \$204.02$$

Now add: I_1 , I_2 , I_3 , and I_4

Revisit Today's Learning Goals

Today's Homework:

Study for the Unit 7 Summative!! (Tomorrow.)

p. 459 # 1 – 4, 6 – 8, 10