

Class _24 Apr 18 - Simple and Compound Interest

Tuesday, April 11, 2023 2:28 PM

Tonight's Class:

- **Chapter 6 Test**
- **Questions?**
- **Working through sections 7.1-7.2**
 - **Simple Interest**
 - **Compound Interest**
- **Work on practice questions from worktext**

7.1 Simple Interest

Focus: Understand and use the formulas for simple interest and amount.

Simple Interest

Interest Earned

$I = Prt$

P = the principal r = interest rate t = time in years

P = principal, amount of money that is either invested or borrowed

r = interest rate per year, written as a decimal

t = time the money is invested/borrowed, in years

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Example 1

Calculating the Simple Interest and the Principal

- A principal of \$3500 was invested for 9 months at 3.24% annual interest. Calculate the simple interest earned on this investment.
- A principal was invested for 1.5 years at 3.59% annual interest and earned \$81.85 simple interest. Calculate the principal.

3.24%

change to a decimal:

- drop the % symbol
- move the decimal 2

$$a) \quad I = prt$$

$$I = (3500)(0.0324)\left(\frac{9}{12}\right)$$

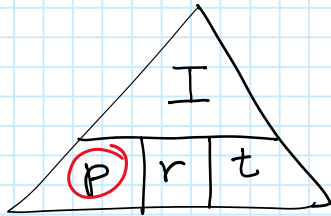
$$I = \$85.05$$

- drop the % symbol
- move the decimal 2 places to the left

.0324

$$b) \quad \frac{I}{rt} = \frac{prt}{rt}$$

$$\frac{I}{(rt)} = p$$



$$I = 81.85$$

$$p = ?$$

$$r = 3.59\% = 0.0359$$

$$t = 1.5 \text{ years}$$

$$p = \frac{I}{rt}$$

$$p = \frac{81.85}{(0.0359)(1.5)}$$

$$p = \$1519.96$$

time months = $\frac{t}{12}$

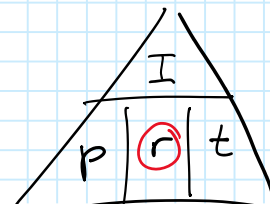
weeks = $\frac{t}{52}$

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

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Example 2 Calculating the Interest Rate and the Time

- A principal of \$1500 was borrowed for 8 months and the simple interest paid was \$64.13. What was the interest rate on the loan?
Give the answer to 2 decimal places.
- A term deposit of \$500 was invested at 2.65% annual interest and earned \$46.38 simple interest at maturity. For how long was the money invested?



earned \$46.38 simple interest at maturity. For how long was the money invested?



a) $P = \$1500$
 $t = \frac{8}{12}$
 $I = \$64.13$
 $r = ?$

$$I = \frac{prt}{pt}$$

$$r = \frac{I}{pt}$$

$$r = \frac{I}{pt}$$

$$r = \frac{64.13}{(1500)(\frac{8}{12})}$$

$$r = 0.06413$$

as a %, this is : 6.413 %
 rounded to 2 decimal places

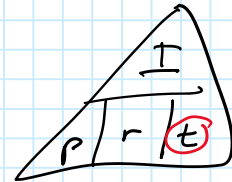
we get 6.41%

b) A term deposit of \$500 was invested at 2.65% annual interest and earned \$46.38 simple interest at maturity. For how long was the money invested?

$I = \$46.38$
 $P = \$500$
 $r = 2.65\%$ which is 0.0265
 $t = ?$

$$I = \frac{prt}{pr}$$

$$t = \frac{I}{pr}$$



$$t = \frac{I}{pr}$$

$$t = \frac{46.38}{(500)(0.0265)}$$

$t = 3.500 \dots \hat{=} 3.5$ years
 3 years and 6 months

Amount of an Investment or a Loan

(future, final amount after you add on the interest)

$$A = P + I$$

- A is the amount in dollars.
- P is the principal in dollars.
- I is the interest earned (or paid) in dollars.

For an investment, replace I in the formula with Prt , then this formula can be written as: $A = P + Prt$, or $A = P(1 + rt)$

$$A = P + I$$

$A = P + Prt$ to solve for "P", we first

$$A = P + Prt$$

to solve for "P",
we first
factor:

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

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

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Example 3

Calculating the Simple Interest and the Amount

- a) A principal of \$1275 is invested and the interest earned is \$38.
What is the amount of the investment? \longrightarrow
- b) The amount of an investment is \$1500 and the principal is \$1150.
What is the interest earned?

$$A = P + I$$

$$= 1275 + 38$$

$$= \$1313$$

$$A = P + I$$

$$1500 = 1150 + I$$

$$I = 1500 - 1150$$

$$I = \$350$$

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Example 4**Calculating the Amount and the Principal**

- a) A principal of \$1000 was invested for 7 months at 3.25% annual simple interest. What is the amount of the investment after 7 months?
 b) What principal must be invested now at 1.25% annual simple interest to have an amount of \$174 in 2 years?

a) $P = \$1000$

$t = \frac{7}{12}$

$r = 3.25\% = 0.0325$

$A = ?$

$A = P + I$

$A = 1000 + Prt$

$A = 1000 + (1000)(0.0325)\left(\frac{7}{12}\right)$

or

$A = P(1 + rt)$

$A = 1000 \left(1 + (0.0325)\left(\frac{7}{12}\right)\right)$

either gives the same result

$A = \$1018.96$

b) $r = 1.25\% = 0.0125$

$A = \$174$

$t = 2 \text{ years}$

$P = ?$

$A = P + I$

$A = P + Prt$

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

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

$P = \frac{174}{(1 + (0.0125)(2))}$

$P = \$169.76$

Try: page 619, #10-11, page 621, #18

7.2 Compound Interest

Focus: Understand and use formula for compound interest.

Compound Interest – the concept

<https://www.youtube.com/watch?v=mnhSrFqeeB8>

Comparing Simple and Compound Interest

<https://www.youtube.com/watch?v=DYPtBE1320Q>

For next class

- Prepare for the **Unit 3 Exam (Chapters 5 and 6)**

Timeline:

- Thursday, April 20 - **Unit 3 Exam**
- Tuesday, April 25 - sections 7.2-7.4
- Thursday, April 27 - **Chapter 7 Test. Last class**