Unit 8 – Financial Applications (Discrete Functions)

8.1 Simple Interest

Learning Goal: We are learning to calculate simple interest.

This *should* be review, but it never hurts to review previously learned material.

Most people are *interested* in their personal financial situations. Obviously that's why we call the money earned on investments **interest**.

→ percents are NOT number → convert %'s to decimals.

Simple **I**nterest is calculated using an interest **r**ate, r (% /a), over a period of time, t (in years).

↳ "annum" (year)

We call the amount invested (borrowed) the **P**rincipal.

Simple.

The Interest Formula $I = Prt$

The **A**mount (of money) Formula

$$A = P + I = P + Prt \Rightarrow \boxed{A = P(1+rt)}$$

$$\Rightarrow \boxed{I = A - P}$$

Example 8.1.1

From your text: Pg. 481 #5f

For each investment, calculate the interest earned and the total amount.

	Principal	Rate of Simple Interest per Year	Time
a)	$500	4.8% = 0.048	8 years
b)	$3 200	9.8%	12 years
c)	$5 000	3.9% (= 0.039)	16 months
d)	$128	18%	5 months
e)	$50 000	24%	17 weeks
f)	$4 500	12%	100 days

a) $A = P(1+rt) = 500(1+6.048(8)) = \$692$ ‖ $I = A - P = 692 - 500 = \$192$

$\frac{16}{12} = 1.3$

c) $\Rightarrow A = 5000\left(1+(0.039)\left(\frac{16}{12}\right)\right) = \$5260$ ‖ $I = A - P = 5260 - 5000 = \$260$

e) $\frac{17}{52}$ years

f) $\frac{100}{365}$ years

Example 8.1.2

Jasmine invests 4850 at $7.6\%/a$ simple interest. If she wants her money to increase to 8000, for how long will she need to keep her money invested?

Given	Want
$P = \$4850$	t
$r = 0.076$	
$A = 8000$	

$A = P(1+rt)$

$8000 = 4850(1 + 0.076t)$

$\div 4850$ $\quad \frac{8000}{4850} = 1 + 0.076t$

$\div 0.076$ $\quad \frac{\frac{8000}{4850} - 1}{0.076} = t$

$t = \frac{\left(\frac{8000}{4850} - 1\right)}{0.076}$

≈ 8.5

$\therefore$ Jasmine needs to leave the investment for about 8.5 years.

Example 8.1.3

Philip (the unwise) borrows $\$1540$ for 90 days by taking a cash advance from the company YourCashIsOurCash. The interest rate Philip (unwisely) agrees to is $26\%/a$ (simple interest). How much money will Philip have to pay back at the end of 90 days, and how much interest does he pay? — convert to years

Given	Want
$P = 1540$	A
$r = 0.26$	(I)
$t = \frac{90}{365}$ years	

$A = P(1+rt)$

$= 1540\left(1 + 0.26\left(\frac{90}{365}\right)\right)$

$= \$1638.73$

$\therefore$ After 90 days Philip has to repay $\$1638.73$

$\Rightarrow$ the interest he pays is $1638.73 - 1540 = \$92.73$

Success Criteria:

- I can recognize that simple interest is calculated only on the principal
- I can recognize that simple interest is an example of a linear function