Chapter 2 Extension Lesson #2:
Simple Interest

$$I = prt$$

I = interest
p = principle
r = rate (as a decimal)
t = time (in years)

Example 1   t = 2   p = $5000   r = .06

Maria opened a savings account that earns 6% annual interest. If she deposited $5000 when she opened the account, how much interest has she earned after 2 years?

$$I = prt$$
$$I = (\$5,000)(.06)(2)$$
$$\boxed{I = \$600}$$

Example 2

$$\frac{6 \, mos}{12 \, mos} = \frac{1}{2} = t = .5 \qquad .08 = r \qquad I = \$100$$

Guadalupe opened a savings account that earns 8% annual interest. After 6 months, she has received $100 in interest. How much money had she deposited when she opened the account?

$$I = prt$$
$$100 = p(.08)(.5)$$
$$\frac{100}{.04} = \frac{.04 \, p}{.04}$$

$$\boxed{\$2500 = p}$$

Example 3

$$p = 6000 \qquad r = 9\% = .09$$
$$I = 1890$$

Mike deposited $6000 into a savings account that receives 9% annual interest. If he earns $1890 in interest, how long was his money in the account?

$$I = prt$$
$$1890 = (6000)(.09)t$$
$$\frac{1890}{540} = \frac{540 \, t}{540}$$

$$\boxed{3.5 \, years = t}$$

Example 4   p = 9000 $2\frac{3mo}{12mo} = 2\frac{1}{4} = 2.25 = t$

I = 2430

Jim deposited $9000 into a savings account for 2 years and 3 months. If he earns $2430 in interest, what is the annual interest rate?

$$I = prt$$

$$2430 = (9000)(r)(2.25)$$

$$\frac{2430}{20,250} = \frac{20,250\,r}{20,250}$$

$$.12 = r$$

$$\boxed{12\% = r}$$

Example 5

Molly invested $30,000, part at 6% annual interest and the rest at 7.5% annual interest. Last year, she earned $1995 in interest. How much money did she invest at each rate?

p = x   17,000   p = 30,000 − x   30,000 − 17,000
r = .06   r = .075
t = 1   t = 1

int. @ 6%   int. @ 7.5%
(x)(.06)(1)   +   (30,000 − x)(.075)(1) =   1995

.06x   +   .075(30,000 − x) = 1995

.06x   +   2250 − .075x = 1995

                    −.015x + 2250 = 1995
                          − 2250   −2250
                    ──────────────────────────
                    −.015x   = −255
                    ───────   ──────
                    −.015   −.015

$$x = 17,000$$

$\boxed{\begin{array}{l} \$17,000 @ 6\% \\ \text{rate} \\ \$13,000 @ 7.5\% \\ \text{rate} \end{array}}$

Example 6

Kyle invested $12,000, part at 12% annual interest and the rest at 13.25% annual interest. His total interest last year was $1540. How much money was invested at each rate?

$p = x$
$r = .12$
$t = 1$
Int.@ 12%
$(x)(.12)(1)$

$.12x$

$.12x$

$+$

$+$

$+$

$+$

$p = 12,000 - x$
$r = .1325$
$t = 1$
Int. @ 13.25%
$(12,000 - x)(.1325)(1) = 1540$

$.1325(12,000 - x) = 1540$

$1590 - .1325x = 1540$

$-.0125x + 1590 = 1540$
$\qquad\qquad -1590 \qquad -1590$

$-.0125x \qquad\qquad = -50$
$-.0125 \qquad\qquad\qquad -.0125$

$x = 4,000$

$4,000 @ 12% rate$
$8,000 @ 13.25% rate$