HOMEWORK...

p. 452: #1 - 6, 10, 11

Questions

3c

$$I = Prt$$

&

$$A = P + I$$

OR

$$A = P + Prt$$

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

Tonight

TODAY ☺

3. a) Principal of $1000 is invested at 5% simple interest, paid annually, for 5 years. What is the rate of return?

b) Which option below would yield the greatest future value? What is the rate of return for this option?

    A. increasing the principal to $1050

    B. increasing the interest rate to 6%

    C. paying interest every 6 months

    D. increasing the term to 6 years

$I = P_i t$

$A = P + I$

WARM-UP

$A = P + Prt$

$A = P(1 + rt)$

You earned $107.42 simple interest on a $671.37 investment over four years.

What was the interest rate?

I ✓

P ✓

t ✓

$$\frac{I}{Pt} = \frac{P r t}{Pt}$$

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

$$r = \frac{107.42}{671.37(4)}$$

$$= 4\%$$

rate of return

The ratio of money earned (or lost) on an investment relative to the amount of money invested, usually expressed as a decimal or a percent.

$$ROR = \frac{earn \,/\, lost}{invested}$$

EXAMPLE 3
p. 448

Determining the duration of a simple interest investment

Ingrid invested her summer earnings of $5000 at 8% simple interest, paid annually. She intends to use the money in a few years to take a holiday with a girlfriend.

a) How long will it take for the future value of the investment to grow to $8000?

b) What is Ingrid's **rate of return**?

Ingrid's Solution

a) $A = P + Prt$

P is $5000.
r is 8%, or 0.08.
A is $8000.

$8000 = 5000 + (5000)(0.08)t$
$3000 = 400t$
$7.5 = t$

I knew P, r, and A. I determined t by substituting these known values into the formula $A = P + Prt$ and solving for t.

Because I needed to isolate t, I knew that the $A = P + Prt$ form of the equation would have fewer solution steps than the $A = P(1 + rt)$ form would.

It will take 8 years for the future value of the investment to be at least $8000.

I knew 7.5 years would not work because the interest is paid annually. This meant that I had to round up to the next whole year. It also meant that, at 8 years, the future value would be more than $8000.

b) After 8 years:
$A = P + Prt$
$A = 5000 + (5000)(0.08)(8)$
$A = 8200$

At 8 years, the future value will be $8200.

Interest earned:
$8200 - $5000 = $3200

I determined the interest earned by subtracting the principal from the future value.

$$\text{Rate of return} = \frac{3200}{5000}$$

Rate of return $= 0.64$

I compared the interest earned with the principal to determine the rate of return.

The rate of return is 64% over 8 years.

EXAMPLE 3
p. 448

Determining the duration of a simple interest investment P

Ingrid invested her summer earnings of $5000 at 8% simple interest, paid annually. She intends to use the money in a few years to take a holiday with a girlfriend.

$$A = P + I \rightsquigarrow I = A - P$$
$$I = 8000 - 5000$$

a) How long will it take for the future value of the investment to grow to $8000? A

$$I = {}^{\$}3000 \quad a)$$

b) What is Ingrid's **rate of return** ?

$$b) \quad ROR = \frac{I}{P} \qquad \leftarrow \quad I = Prt$$
$$= 5000(0.08)(8)$$
$$= 3200$$

$$= \frac{3200}{5000} \times 100\%$$

$$ROR = 64\%$$

$$\frac{\boxed{I}}{P \mid r \mid \boxed{t}}$$

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

$$= \frac{3000}{5000(0.08)}$$

$$= \boxed{7.5 \text{ years}}$$

EXAMPLE 4 Determining the rate of interest on a simple interest investment

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Grant invested $25 000 in a simple interest Canada Savings Bond (CSB) that paid interest annually.

a) If the future value of the CSB is $29 375 at the end of 5 years, what interest rate does the CSB earn?

b) Grant cashed in the bond after 4.5 years because a house he had been admiring came up for sale and he needed a down payment. How much money did he have for the down payment?
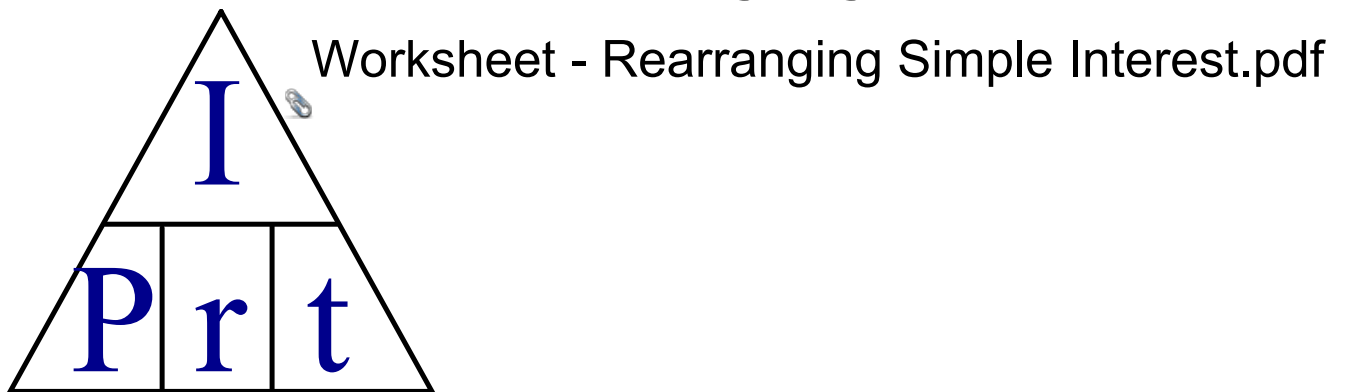
a) $P = 25000$
$A = 29375$
$t = 5$ years

$I = 4375$

a) $r = \dfrac{I}{Pt}$

$= \dfrac{4375}{25000(5)} \times 100\%$

$= 3.5\%$

b) $P \checkmark$ $A\,?$
$r \checkmark$

$t = 4$ years
(paid annually)

$A = P + Prt$

$= 25000 + 25000(0.035)(4)$

$= \$28500$

PRACTICE rearranging... $I = Prt$

Worksheet - Rearranging Simple Interest.pdf

When finished...PRACTICE rate of return (ROR)

Text p. 452: #3 & #12

Attachments

Worksheet - Rearranging Simple Interest.pdf