

Date _____

Name _____

9.1 Simple Interest

Simple interest is interest paid only on the amount of money deposited or the amount borrowed, called the principal. The term is the length of time over which the money is deposited or borrowed. The interest rate is often expressed "per annum," which means per year.

The amount of simple interest accumulated on an investment or loan is calculated using the following formula:

$$I = Prt$$

I is the interest earned or due. P is the principal

r is the rate, expressed as a decimal

t is the term (time) of the investment or loan, in years

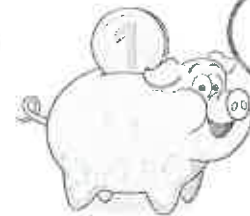
For an investment, you can calculate the total value at the end of the term using this formula.

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

$A = P + Prt$

$A = P + I$

A is the amount of the investment.



Read the question carefully!

Recall: Express each amount of time in years:

- 18 months 1.5
- June $\frac{1}{12}$
- 150 days $\frac{150}{365} = \frac{30}{73}$

- 20 weeks $\frac{20}{52} = \frac{10}{26} = \frac{5}{13}$
- 36 months 3
- 54 months 4.5

1. Calculate the simple interest earned on each investment:

a) \$500 for 6 months at 8% per year

$$\begin{aligned} I &= Prt \\ &= 500(0.08)(0.5) \\ &= \$20 \end{aligned}$$

c) \$450 for 6 years at $6\frac{1}{4}\%$ per year

$$\begin{aligned} I &= Prt \\ &= 450(0.0625)(6) \\ &= \$168.75 \end{aligned}$$

b) P t r
\$1000 for $2\frac{1}{2}$ years at 3% per year

$$I = Prt$$
$$= 1000(0.03)(2.5)$$
$$= \$75$$

d) P t r
\$600 for 5 years at 3.75% per year

$$I = Prt$$
$$= 600(0.0375)(5)$$
$$= \$112.50$$

2. You decide to invest \$300.00 from your savings. You have two options:

- ❖ Option A: Lend it to your parents for 1 year at an interest rate of 5% per annum.
- ❖ Option B: invest it for 3 years at a bank that pays simple interest of 6% per annum.

a) What amount of interest will you receive with each option?

Option A: $I = Prt$

$$= 300(0.05)(1)$$
$$= \$15.00$$

Option B: $I = Prt$

$$= 300(0.06)(3)$$
$$= \$54.00$$

b) Describe an advantage to choosing each option.

Option A: Money back faster, trusted parents, may give back anytime needed.

Option B: ↑ secure, ↑ interest, etc.

3. What happens to the amount of interest earned when the principal and the term stay the same but the rate doubles?

I doubles

4. What happens to the amount of interest earned if the principal and the rate stay the same but the term doubles?

I doubles.

5. How much money would you have after 10 years if you deposited \$1000.00 at a rate of 4.50% simple interest per annum.

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

$$I = Prt$$
$$= 1000(0.045)(10)$$
$$= \$450$$

$$A = P + I$$
$$= 1000 + 450 = \$1450$$

OR

$$A = P(1 + rt)$$
$$= 1000(1 + 0.045(10))$$
$$= 1000(1.45)$$
$$= \$1450$$

Earning interest in a regular savings account is slow. To increase the amount of interest earned, investors may choose a **Guaranteed Investment Certificate** GIC. This investment involves very low risk for the investor with an amount of interest guaranteed by the bank. While it pays more than a regular savings account, it is usually worth less than other investments which may involve more risk.

6. Ron's business has \$22 000 in cash available to invest for a short period of time. He buys a 6-month GIC that will pay 1.95% simple interest.

a) How much interest will he earn?

$$\begin{aligned} I &= Prt \\ &= 22000(0.0195)(0.5) \\ &= \$214.50 \end{aligned}$$

b) Determine the future value of his investment.

$$\begin{array}{r} 22000.00 \\ + 214.50 \\ \hline 22214.50 \end{array}$$

7. Don invested \$1000 for three years into a GIC that matured at \$1063. What was in the simple interest rate?

$$\begin{aligned} \frac{I}{P} &= \frac{Prt}{Pt} & r &= \frac{I}{Pt} = \frac{63}{1000(3)} = 0.021 \\ & & &= 2.1\% \end{aligned}$$

$$\begin{aligned} I &= A - P \\ &= 1063 - 1000 \\ &= 63 \\ P &= 1000 \\ t &= 3 \text{ yr} \end{aligned}$$

8. Jon invested \$15 000 at 2.83% simple interest and cashed in \$15 212.25. How long was his money invested for?

$$\begin{aligned} P &= 15000 \\ r &= 2.83\% = 0.0283 \\ I &= 15212.25 - 15000 = 212.25 \end{aligned}$$

$$\begin{aligned} I &= Prt \\ t &= \frac{I}{Pr} = \frac{212.25}{15000(0.0283)} = 0.5 \text{ yrs or } 6 \text{ mo.} \end{aligned}$$

A term deposit is similar to a GIC in that you guarantee the money for a set amount of time and the bank guarantees the interest rate. Calculate the interest earned and future value of each term deposit if \$1500 is invested.

1 year term	2.95% simple interest	\$44.25	\$1544.25
2 year term	3.10% simple interest	\$93	\$1593
3 year term	3.15% simple interest	\$141.75	\$1641.75

