

Walt Calculate simple interest

Success Criteria by the end of session I am able to apply the formula and calculate interest I know the meaning of the principal amount , rate of interest is given per year and the time to be calculated.

- I know how to write fractions if I am calculating interest for few months out of 12 months
- I know how to calculate the percentage of an amount.
- convert percentages to decimals

Some reading for you

When you invest money in a financial institution, such as a bank, the bank pays for the use of your money. This payment by the bank is called **interest** and is calculated as a percentage of the amount invested. Similarly, when you borrow money a charge is made for the use of the bank's money. This charge also is called **interest** and it is calculated as a percentage of the amount borrowed.

If the interest is calculated as a fixed percentage of the original amount invested (or borrowed), it is called **simple interest**.

Learning the basics of simple interest formula

EXAMPLE 1

Calculate the simple interest received when \$8000 is invested for 3 years at 4.5% p.a.

Solve	Think	Apply
$\begin{aligned} \text{Interest for 1 year} &= 4.5\% \text{ of } \$8000 \\ &= 0.045 \times \$8000 \\ &= \$360 \\ \text{Interest for 3 years} &= \$360 \times 3 \\ &= \$1080 \end{aligned}$	<p>Find the simple interest of 4.5% on \$8000 for 1 year and multiply it by 3 to find the interest over 3 years.</p>	$\begin{aligned} \text{Interest} &= \frac{\text{rate (p.a.)}}{100} \times \text{amount invested} \\ &\quad \times \text{number of years} \end{aligned}$

If \$ P is invested for T years at $r\%$ p.a., the simple interest, I , can be found using the formula:

$$I = PRT$$

where P is called the **principal**, R is the **interest rate** p.a. expressed as a decimal ($R = \frac{r}{100}$) and T is the time in years.

EXAMPLE 2

Use the simple interest formula to calculate the simple interest earned on an investment of \$10 800 at 3.9% p.a. for 5 years.

Solve	Think	Apply
$\begin{aligned} I &= PRT \\ &= \$10\,800 \times 0.039 \times 5 \\ &= \$2106 \end{aligned}$	<p>Use the simple interest formula $I = PRT$ where P is \$10 800, r is 3.9% so R is $\frac{3.9}{100} = 0.039$ and T is 5 years.</p>	<p>Substitute the values into the formula $I = PRT$, remembering that R is always a decimal not a percentage.</p>

It's your time to apply the formula

- 1 Calculate the simple interest received when \$7000 is invested for 2 years at 5% p.a.
- 2 Calculate the simple interest paid when \$12 000 is borrowed for 4 years at 3% p.a.
- 3 Complete the following table.

Principal	Annual interest rate	Time invested (years)	Simple interest
\$5 800	7%	4	
\$15 000	3.5%	3	
\$24 000	4.5%	5	
\$6500	5%	6	
\$18 000	2.8%	2	
\$9 300	3.4%	4	
\$6 000	3%	3	

Further learning by calculating total amount adding interest to the principal

● EXAMPLE 3

Calculate the amount to which \$7000 will grow in 3 years if invested at 6.5% p.a. simple interest.

Solve	Think	Apply
$\text{Interest} = \$7000 \times 0.065 \times 3$ $= \$1365$ $\text{Amount after 3 years} = \$7000 + \$1365$ $= \$8365$	Use the simple interest formula $I = PRT$ to calculate the interest over 3 years. Add the principal (\$7000) to the interest to find the total amount.	Convert the percentage interest rate to a decimal by dividing by 100.

- 4 Calculate the amount to which \$9000 will grow in 3 years if invested at 6.5% p.a. simple interest.
- 5 Calculate the amount to which \$20 000 will grow in 5 years if invested at 4% p.a. simple interest.
- 6 If I invest \$13 500 at 7.4% p.a. simple interest, how much will I have in 4 years time?

Walt Calculate interest for given months instead of years

Success Criteria :

- I can write months as a fraction over 12 months as a denominator
- I can convert percentage into a decimal or fraction
- I know I need to calculate the total amount of money received after the term of investment is over

EXAMPLE 4

Calculate the simple interest earned on \$6000 at 8% p.a. for 16 months.

Solve	Think	Apply
$\text{Interest} = \$6000 \times 0.08 \times \frac{16}{12}$ $= \$640$	Number of years the money is invested = $\frac{16}{12}$	Convert months to years by dividing by 12.

- 7** Calculate the simple interest earned on each of these investments.
- | | |
|----------------------------------------------|-------------------------------------------|
| a \$5000 at 9% p.a. for 18 months | b \$7000 at 8% p.a. for 15 months |
| c \$12 500 at 10% p.a. for 9 months | d \$3800 at 12% p.a. for 27 months |
| e \$24 000 at 7.8% p.a. for 45 months | f \$8600 at 9.6% p.a. for 6 months |

- 7** Calculate the simple interest earned on each of these investments.
- | | |
|----------------------------------------------|-------------------------------------------|
| a \$5000 at 9% p.a. for 18 months | b \$7000 at 8% p.a. for 15 months |
| c \$12 500 at 10% p.a. for 9 months | d \$3800 at 12% p.a. for 27 months |
| e \$24 000 at 7.8% p.a. for 45 months | f \$8600 at 9.6% p.a. for 6 months |

Applying the linear proportions if the total interest earned is given to find out the number of years taken to that much amount.

EXAMPLE 5

Rene invested \$4700 at 6% p.a. simple interest. How long did it take to earn \$1128 in interest?

Solve	Think	Apply
$\text{Interest for 1 year} = 0.06 \times \$4700 = \$282$ $\text{Number of years invested} = \frac{\$1128}{\$282} = 4$ Rene invested his money for 4 years.	Find the interest earned for 1 year: \$282. Divide the total interest by \$282 to get 4 years.	Calculate the annual interest. Divide by this amount to obtain the number of years.

- 8** Harry invested \$13 000 at 6% p.a. simple interest. How long would it take to earn \$4680 in interest?
- 9** Joy invested \$2800 at 3.5% p.a. simple interest. How long would it take to earn \$490 in interest?

Changing the subject or rearrange the formula to find out the rate

EXAMPLE 6

Colin invested \$4000 for 5 years and earned \$700 in interest. What was the annual rate of simple interest?

Solve	Think	Apply
$\begin{aligned} \text{Interest for 1 year} &= \$700 \div 5 \\ &= \$140 \\ \text{Annual interest rate} &= \frac{\$140}{\$4000} \times 100\% \\ &= 3.5\% \end{aligned}$	<p>Divide the interest earned by the number of years. Divide the annual interest by the principal and multiply by 100 to find the interest rate as a percentage.</p>	<p>When calculating interest rates always convert the amount of interest to amount per year.</p>

- 10** Kim invested \$6000 for 5 years and earned \$2100 in interest. What was the annual rate of simple interest?
- 11** Lauren invested \$17 000 for 4 years, earning \$3128 in interest. What was the annual rate of simple interest?

Check your answers

1 \$700

2 \$1440

3

Principal	Simple interest
\$5 800	\$1624
\$15 000	\$1575
\$24 000	\$5400
\$6500	\$1950
\$18 000	\$1008
\$9 300	\$1264.80
\$6 000	\$540

4 \$10 755

5 \$24 000

6 \$17 496

7 a \$675

b \$700

c \$937.50

d \$1026

e \$7020

f \$412.80

8 6 years

9 5 years

10 7% p.a.

11 4.6% p.a.