

Earning interest

When you invest money, it earns interest. There are two types of interest: simple interest and compound interest. With simple interest, the interest earned each year remains the same.

Review: percentages as decimals

In financial calculations the rate of interest is a percentage, but the rate is expressed as a decimal in the calculations.

Example 1

Express 12% as a decimal.

Solution 1

12% means 12 divided by 100. As a decimal, 12% is equivalent to 0.12. On your calculator you can change 12% to a decimal by pressing $12 \div 100 =$.

Example 2

What is $4\frac{1}{2}\%$ as a decimal?

Solution 2

$4\frac{1}{2}\%$ means $4\frac{1}{2} \div 100$.

On your calculator press $4\frac{1}{2} \div 100 =$ and the answer 0.045 will be displayed.

Worksheet 5:1

Did you know?

Many different items have been used as money. Over 1400 years ago, cocoa beans (chocolate) were used as currency in Mexico.

1 Express the following percentages as decimals.

- | | | | |
|--------------------|--------------------|-------------------|---------------------|
| a 11% | b 15% | c 25% | d $17\frac{1}{2}\%$ |
| e 8% | f 9% | g 4% | h 1% |
| i $3\frac{1}{2}\%$ | j $7\frac{1}{2}\%$ | k 1.7% | l 2.3% |
| m 0.5% | n $\frac{1}{2}\%$ | o $\frac{1}{4}\%$ | p $\frac{3}{4}\%$ |

2 Change the following times to years. Express your answers as whole numbers or numbers involving fractions.

- | | |
|-------------|-------------|
| a 24 months | b 52 weeks |
| c 36 months | d 26 weeks |
| e 6 months | f 18 months |
| g 30 months | h 60 months |

3 Fill in the blanks.

- | | |
|--|---------------------------|
| a 4 weeks = _____ days | b 21 days = _____ weeks |
| c 6 months = _____ days | d 1095 days = _____ years |
| e From 1 April to 1 October = _____ years | |
| f From 1 March to 1 October = _____ months | |
| g From 1 January to 31 March inclusive, non-leap year = _____ days | |



5:1

Simple interest

The formula for simple interest is:

$$I = Prn$$

where I = total interest earned, P = principal,
 r = rate of interest as a decimal and n = number of years.

LANGUAGE

The principal is the original amount invested.

Example 3

Jayne invested \$700 at 5% p.a. simple interest for 3 years.

- How much interest will she earn?
- Calculate the total amount in her account at the end of 3 years.

Solution 3

- $P = \$700$, $r = 0.05$ and $n = 3$ years.
Interest = $\$700 \times 0.05 \times 3$
= \$105
- At the end of 3 years, she will have
 $\$700 + \$105 = \$805$ in her account.

Example 4

Daniel invested \$5600 at 8.2% p.a. simple interest for 11 months. How much interest will he earn? Answer correct to the nearest cent.

Solution 4

- $P = \$5600$, $r = 0.082$ and
 $n = \frac{11}{12}$ years.
Interest = $\$5600 \times 0.082 \times \frac{11}{12}$
= \$420.93

Error alert!

In the simple interest formula the time must be in years because the interest rate is per annum, or per year.

Worksheet 5:2

- Use the formula $I = Prn$ to calculate the value of I when $P = \$6000$, $r = 0.07$ and $n = 8$ years.
- Calculate the simple interest on each of these investments. Express your answer in dollars and cents.
 - \$8000 at 4% p.a. for 5 years
 - \$6200 at 6% p.a. for 3.5 years
 - \$12000 for 7 years at 5.3% p.a.
 - \$1500 at 4.3% p.a. for 2 years
- How much simple interest will you earn when you invest \$7200 at 4.8% p.a. for 6 months?
- Determine whether the following statement is true or false. Use some calculations to justify your answer.

'If the interest rate doubles, you earn twice as much interest.'
- Spot the errors in Fred's calculation below and give the correct solution. Lindsay invested \$5000 for 3 months at 8.3% p.a. simple interest. Calculate the interest Lindsay will receive. This is Fred's calculation:

$$\begin{aligned}I &= Prn \\I &= \$5000 \times 8.3 \times 3 \\I &= \$124\,500\end{aligned}$$



Chapter 5

- 2 a 9 doors b $13.1 \text{ m} \times 10 \text{ m}$
 c 3 m d 109.7 m^2
 e 40:31 f 10.94%
 g $6 \text{ m} \times 2.5 \text{ m}$ h 15 m^2
 i 16.5 m^2 j \$1143.45
 k i $\frac{1}{4}$ ii 4 times iii 438.8 m^2
 l Many answers possible,
 e.g. $20 \text{ m} \times 21.94 \text{ m} = 438.8 \text{ m}^2$
- 3 a 3 bedrooms b Yes c Yes
 d i E ii B iii A
 iv D v C
 e 560 m^2
 f No. The minimum length of the block has to be 40.6 m and the block is only 35 m long.
- 4 a Next to the bathroom and laundry
 b 2 toilets
 c i A ii D iii C iv B
 d South e $14.34 \text{ m} \times 36.65 \text{ m}$

Matching plans and exteriors activity

- 1 E 2 F 3 C 4 G
 5 D 6 A 7 B

Worksheet 4: 5

- 1 a \$95 200
 b Basic kit \$56 000, deluxe kit \$70 000
- 2 a $20 \text{ m} \times 12.5 \text{ m}$ b 250 m^2 c 112 m^2
 3 a 65 m b 910 m c \$4368
 4 a 4.6 m^2 b 5.29 m^2 c \$165.05
 5 \$30 000
 6 a 10% b \$58 800 c 30% d \$29 400
 7 Teacher to check

Check your progress—chapter 4

- 1 a 78 m b 60 m c 44 m
 2 a 640 m^2 b 600 m^2 c 720 m^2
 3 a 120 m^2 b 52 m
 4 575 m^2
 5 a 79 m^2 b \$102 226
 c Yes. Her house is only 79 m^2 and she can have a house up to 158 m^2 on the land.
 6 a $40.9 \text{ m} \times 17.2 \text{ m}$ b 3 bedrooms
 c All of them
 d Off the kitchen and garage
 e $3.7 \text{ m} \times 3.6 \text{ m}$ f No
 g 2 windows h $5.6 \text{ m} \times 3.7 \text{ m} = 20.72 \text{ m}^2$
 i Kitchen, living, dining, laundry
 j i North ii South iii West
 k Yes. There is a 1.5 m space for the bench.
 l \$15 750 m $10 \text{ m} \times 1.6 \text{ m}$

Worksheet 5: 1

- 1 a 0.11 b 0.15 c 0.25 d 0.175
 e 0.08 f 0.09 g 0.04 h 0.01
 i 0.035 j 0.075 k 0.017 l 0.023
 m 0.005 n 0.005 o 0.0025 p 0.0075
- 2 a 2 years b 1 year c 3 years d $\frac{1}{2}$ year
 e $\frac{1}{2}$ year f $1\frac{1}{2}$ years g $2\frac{1}{2}$ years h 5 years
- 3 a 28 b 3 c $182\frac{1}{2}$ d 3
 e $\frac{1}{2}$ f 7 g 90

Worksheet 5: 2

- 1 \$3360
 2 a \$1600 b \$1302 c \$4452 d \$129
 3 \$172.80
 4 True.
 $P = \$5000, r = 0.06, n = 3$ years gives $I = \$900$.
 $P = \$5000, r = 0.12, n = 3$ years gives $I = \$1800$.
 5 $r = 0.083$ and $n = \frac{1}{4}$ year
 Correct solution, $I = \$103.75$

Worksheet 5: 3

- 1 a 5.95% p.a. b 5.10% p.a.
 c 5.30% p.a. d 4.20% p.a.
- 2 The building society only accepts investments of \$10 000 or more as term deposits.
- 3 She could invest \$100 000 at 5.80% p.a. and \$40 000 at 5.20% p.a.
- 4 a \$624 b \$223.13
 c \$4938.50 d \$1454.88
- 5 a and b Answers subject to change
 c i Longer ii Larger iii Maturity
- 6 Answers subject to change
 a \$25 832.88 b \$832.88 c \$1238.32
 d \$6371.51 e \$29 108.72
- 7 a i Minimum deposit is \$5000 and she only has \$1500.
 ii Cheque-a-Month, Bonus Saver, Christmas
 iii If Nicole does not need her money in a hurry, the Christmas account pays the best interest (6.5% p.a.). If Nicole wants some flexibility, she should use the Bonus Saver account (6.3% p.a.).
 b i Bonus Saver ii \$31.50
 d i The Flexible account has no fixed term and the money is 'at call'.
 ii \$253.13