THE LEADING EDGE

Ready for
Mathematical Methods 1 & 2 CAS

Anne Matheson and Kylie Boucher

hi.com.au/theleadingedge

Contents

Introduction

Are you going to study Mathematical Methods 1 & 2 CAS next year?
Did you have trouble with some concepts in Year 10 maths and want to do well in Mathematical Methods 1 & 2 CAS?
Have you just started Mathematical Methods 1 & 2 CAS?
Are you doing Mathematical Methods 1 & 2 CAS but struggling with it?

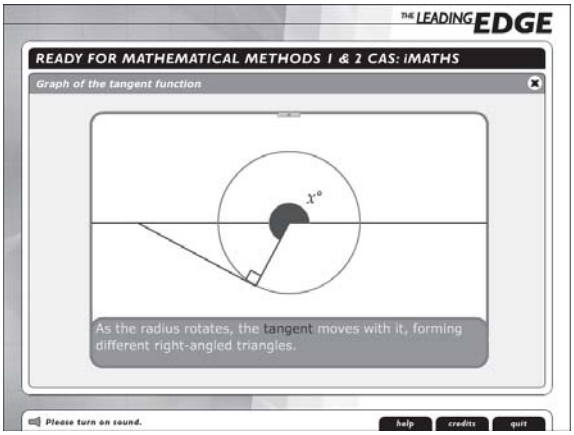
If you answered *yes* to any of these questions then *The Leading Edge: Ready for Mathematical Methods 1 & 2 CAS* and iMaths CD are for you.

There is no use trying to get to grips with Mathematical Methods 1 & 2 CAS if you haven't got the building blocks you need. If there is something you didn't quite understand in previous years, or if you need to practise a fundamental skill a little more, you'll find it here. All the skills and concepts you need to be prepared for this subject are covered in this book.

The six chapters of this book cover the revision of topics that you should have a sound knowledge of prior to commencing Mathematical Methods 1 & 2 CAS. The first chapter practises skills that are used in many areas of study. The other chapters look at specific skills required for particular sections of the course. You need to study all the areas, so it would be a good idea to work through all the material provided in the book.

At the front of this book there is a section that provides clear instructions on the use of the TI graphics calculator to complete the functions required in the Mathematical Methods 1 & 2 CAS course. Each of the chapter sections of *Ready for Mathematical Methods 1 & 2 CAS* has clear information and examples, followed by questions of increasing difficulty and space to write the step-by-step solutions. At the end of the book are the tear-out answers to all the questions.

The accompanying iMaths CD provides you with eTutorials that offer animated, narrated presentations of the key concepts and skills you will need.



Note that *Ready for Mathematical Methods 1 & 2 CAS* and accompanying iMaths CD do not cover the Mathematical Methods 1 & 2 CAS course content. They help to ensure you are ready for the course.

For help with Mathematical Methods 1 & 2 CAS course content, see the following titles in the Leading Edge series:

- *The Leading Edge: Mathematical Methods 1 & 2 CAS Pocket Study Guide*
- *The Leading Edge: Mathematical Methods 1 & 2 CAS Exam 1 Builder*
- *The Leading Edge: Mathematical Methods 1 & 2 CAS Exam 2 Builder*

Visit us at **hi.com.au/theleadingedge**

2.2 Finding *x*- and *y*-intercepts

Worked example

Find the *x*-intercept and *y*-intercept of $y = 3x + 5$.

Steps	Solution
1. State the equation.	$y = 3x + 5$
2. Find the *x*-intercept. Let $y = 0$.	$0 = 3x + 5$
3. Subtract 5 from both sides.	$-5 = 3x$
4. Divide both sides by 3.	$-\frac{5}{3} = x$
5. State the answer.	*x*-intercept = $-\frac{5}{3}$
6. Find the *y*-intercept. Let $x = 0$.	$y = 3 \times 0 + 5$
7. Simplify.	$y = 0 + 5$ $y = 5$
8. State the answer.	*y*-intercept = 5

Exercise 2.2

1 Find the *x*-intercept and *y*-intercept of each of the following equations.

(a) $y = 2x - 7$

x-intercept (when $y = 0$):

$y = 2x - 7$

$\ldots\ldots = 2x - 7$

$\ldots\ldots = 2x$

$\frac{\ldots\ldots}{\ldots\ldots} = x$

x-intercept = $\frac{\ldots\ldots}{\ldots\ldots}$

y-intercept (when $x = 0$):

$y = 2x - 7$

$= 2 \times \ldots\ldots - \ldots\ldots$

$= \ldots\ldots$

y-intercept = $\ldots\ldots$

(b) $2x + 3y = 12$

Chapter 4 Trigonometry preparation

4.1 Pythagoras' Theorem

Pythagoras' Theorem can be used to find the length of the sides of a right-angled triangle. To use it you need to know the lengths of two sides of the triangle.

Pythagoras' Theorem states that:

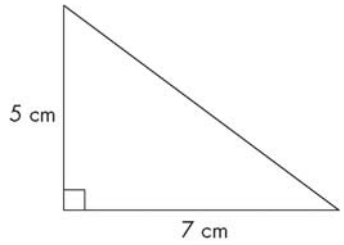
$$c^2 = a^2 + b^2$$

where c represents the hypotenuse and a and b represent the other sides of a right-angled triangle.

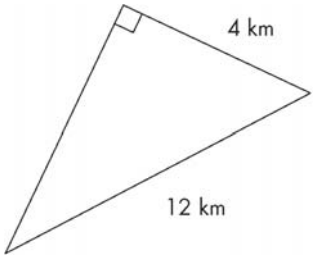
Worked example

Find the missing side length, correct to one decimal place, in each of the following triangles.

(a)



(b)

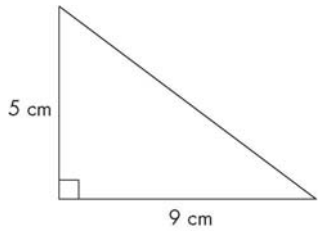


Steps	Solutions
(a) 1. Write the values for a, b and c.	**(a)** $a = 5$, $b = 7$, $c = ?$
2. Write the formula for Pythagoras' Theorem.	$c^2 = a^2 + b^2$
3. Substitute the values for a and b.	$c^2 = 5^2 + 7^2$
4. Simplify the equation.	$= 25 + 49$
	$= 74$
	$c = \sqrt{74}$
5. Write the answer correct to one decimal place.	$c \approx 8.6$ cm
(b) 1. Write the values for a, b and c.	**(b)** $a = ?$, $b = 4$, $c = 12$
2. Write the formula for Pythagoras' Theorem.	$c^2 = a^2 + b^2$
3. Substitute the values for b and c.	$(12)^2 = a^2 + 4^2$
4. Rearrange the equation so that a is on the left.	$144 = a^2 + 16$
	$a^2 = 144 - 16$
5. Simplify the equation.	$a = \sqrt{128}$
6. Write the answer correct to one decimal place.	$a \approx 11.3$ km

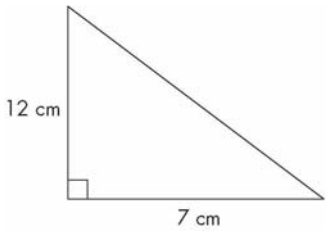
Exercise 4.1

1 Use Pythagoras' Theorem to find the unknown side length for each of the following triangles.

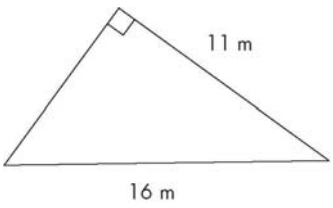
(a)



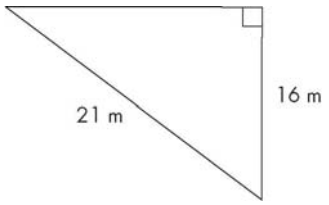
(b)



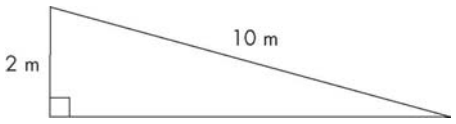
(c)



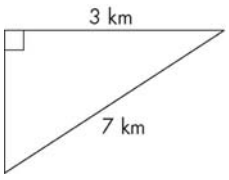
(d)



(e)



(f)

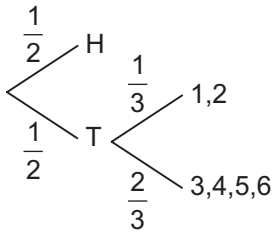


6.7 Finding the probability using tree diagrams

Example 1

A fair coin is tossed and if a tail is obtained a normal die is rolled. Use a tree diagram to find the probability of obtaining a number less than 3.

Solution



Pr(a tail first, then a number < 3)

$= \frac{1}{2} \times \frac{1}{3}$

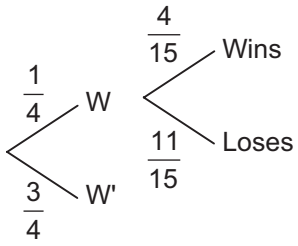
$= \frac{1}{6}$

Example 2

A certain greyhound does not perform on a wet track as well as he could on a dry track. If the track is wet, his probability of winning is $\frac{4}{15}$. For his next race, the probability of a wet track is $\frac{1}{4}$. Using a tree diagram, find the probability that the greyhound runs on a wet track and wins.

Solution

Wet track Wins the race



Pr(wins on a wet track)

$= \frac{1}{4} \times \frac{4}{15}$

$= \frac{1}{15}$

Exercise 6.7

1 **(a)** A spinner labelled 1 to 4 is spun and if an odd number is obtained a normal die is rolled. Using a tree diagram, find the probability that an even number is rolled on the die.