

Numeracy summary

Introduction

Purpose

At CDU you are probably either a TAFE student or a Higher Education student. In your studies you may be asked to demonstrate mathematical skills. Some skills you may already have from your schooling, other studies or personal experience.

Building your numeracy skills

The skills that you need for everyday life or study are also called numeracy skills. These skills may include tasks like:

- measuring a room in a house
- converting from millilitres to litres
- using a calculator for trigonometry
- adding GST (%) when writing a quote
- scientific notation
- using ratios for mixing chemicals/medicines

Numeracy and foundation maths

Converting measurements is important to maintain accuracy. You use measurements when you

- build or construct something
- time a race
- drive somewhere
- pave a garden
- do a scientific experiment
- work out medical dosages

To measure mass or weight, we use grams or tonnes. For area, we use metres squared, for capacity of fluid use litres, length is in metres and volume is in metres cubed. The metric system works on multiples of 10, which is where we get our other measurements of kilo, centi, milli and so on. Although this video focuses on length and converting between millimetres and metres, the underlying theory is the same for all metric conversions. That is, if we know the larger unit we multiply to find the smaller unit. And if we know the smaller unit, we divide to get the larger unit.

Fractions, decimals and percentages are types of ratio. Ratio is a term that describes how numbers relate to each other. You can further your understanding of ratios by going to our Ratio page. In short, fractions, decimals and percentages are ways of describing part of a whole.

- **A fraction** is a part of a whole number divided into equal parts. The top number is the numerator, which represents the number of parts of a whole. The bottom number is the denominator, which represents how many equal parts the number was divided into.
- **Decimal** means 'based on 10', just like percentage is based on 100. Think of a decimal number as those numbers that are in between whole numbers. For example, 10 and 11 are whole numbers and 10.5 is between them. The first component of 10.5 is the whole number (10), and the second component is the fractional part (.5). One of the most common uses of decimals is with money, such as \$6.99.
- **Percent** means out of 100 and is represented by the symbol %. The easiest way to visualize a percentage is by using a 100s square. As percentages are out of 100, we count the number of boxes that are shaded to get the percentage.

Perimeter of simple shapes

The perimeter is the total length of all sides of a shape. Finding the perimeter is useful for many reasons. Some include:

- putting up a fence
- measuring a window frame
- designing a garden bed
- deciding if you have enough space to store something

Rectangles and squares can be worked out using this formula:

$$(\text{height/length} \times 2) + (\text{width} \times 2)$$

This formula will only work if the shape has either 4 equal sides or 2 sets of equal sides.

Circles are another useful shape. We call the perimeter of a circle its circumference. Use this formula:

π is pi. Pi is a number we use for calculations with circles. It has many decimal places, but we often round it off to three places, which is 3.142.

The circumference of a circle = $\pi \times \text{diameter}$

The perimeter of a semi-circle = the circumference $\div 2$ plus the diameter.

If you have to work out the perimeter of other shapes, break them down into smaller shapes.

Pythagoras Theorem

Pythagoras is useful for many trades and for our daily life. It helps us with tasks like:

- A/C theory
- setting out
- building wall frames
- form working

- buying a TV/Computer monitor
- air navigation.

The key to understanding Pythagoras is being able to identify the hypotenuse. That is, the longest side of a right-angle triangle.

The equation to remember is $a^2 + b^2 = c^2$.

Here is an example of a triangle:

- If a triangle side a is 8cm, and side b is 5cm. We need to work out what side c is.
- We put the numbers in that we do know. $8^2 + 5^2 = c^2$. That is, $64 + 25 = c^2$.
- We know that $c^2 = 89$.
- To get c from c^2 we need to find the square root of our answer.
- The square root of 89 is 9.433.
- We round our answer down to 9. Therefore, side c = 9cm.

Trigonometry

Trigonometry is common for a number of trades. It will help you to:

- pitch a roof
- construct stairs
- adjust cutting tools
- understand AC theory.

Trigonometry is the relationship between sides and angles in a right angled triangle. It helps us find an unknown angle or side. To do this, we need to know the meaning of sine, cosine and tangent. Sin, cos and tan for short. We also need to know the names of the sides we give to a triangle. We use the theta symbol for our unknown angle.

The hypotenuse is the longest, diagonal side. The adjacent side is the one next to the given angle. The opposite side is the one opposite the angle. These three formulas are all you need. You can remember the acronym SOHCAHTOA. We are looking for the length of side b, which we can label 'opposite'. We can also label the adjacent side. Use this formula.

- $\tan 55 = \text{opposite} \div 12\text{cm}$.
- We need to transpose to solve. $\tan 55 \times 12\text{cm} = \text{the opposite side}$.
- $\tan 55 \times 12\text{cm} = 17.137\text{cm}$. After rounding down, side b is 17cm.

To find an unknown angle, the same 3 formulas are used but we need to use the inverse key on our calculator. This can be found by pressing shift, then either sin, cos or tan. For example, we are looking for angle x. We know the opposite and the hypotenuse, so we know we are using sine. Putting it into our equation, $\sin = 100 \div 200$, which makes sine 0.5. To find x we use the inverse key and this gives us 30 degrees.