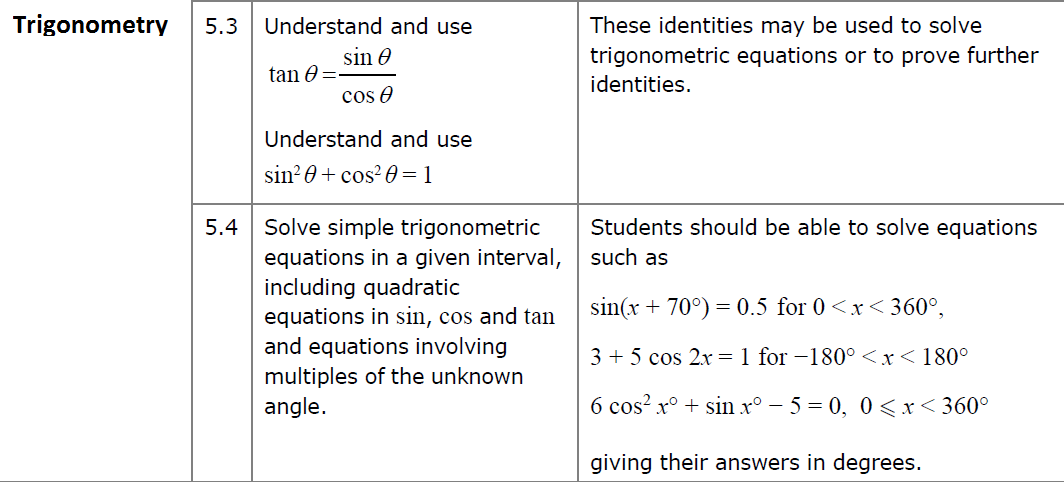
Lower 6 Chapter 10

Trigonometric Identities and Equations

Chapter Overview

1. Know exact trig values for and understand unit circle.
2. Use identities and
3. Solve equations of the form and
4. Solve equations which are quadratic in sin/cos/tan.



sin/cos/tan of

You will frequently encounter angles of in geometric problems. Why?

Although you will always have a calculator, you need to know how to derive these.

**All you need to remember:**

** Draw half a unit square and half an equilateral triangle of side 2.**

The Unit Circle and Trigonometry

For values of in the range , you know that and are lengths on a right-angled triangle:

And what would be the **gradient** of the bold line (hypotenuse)?

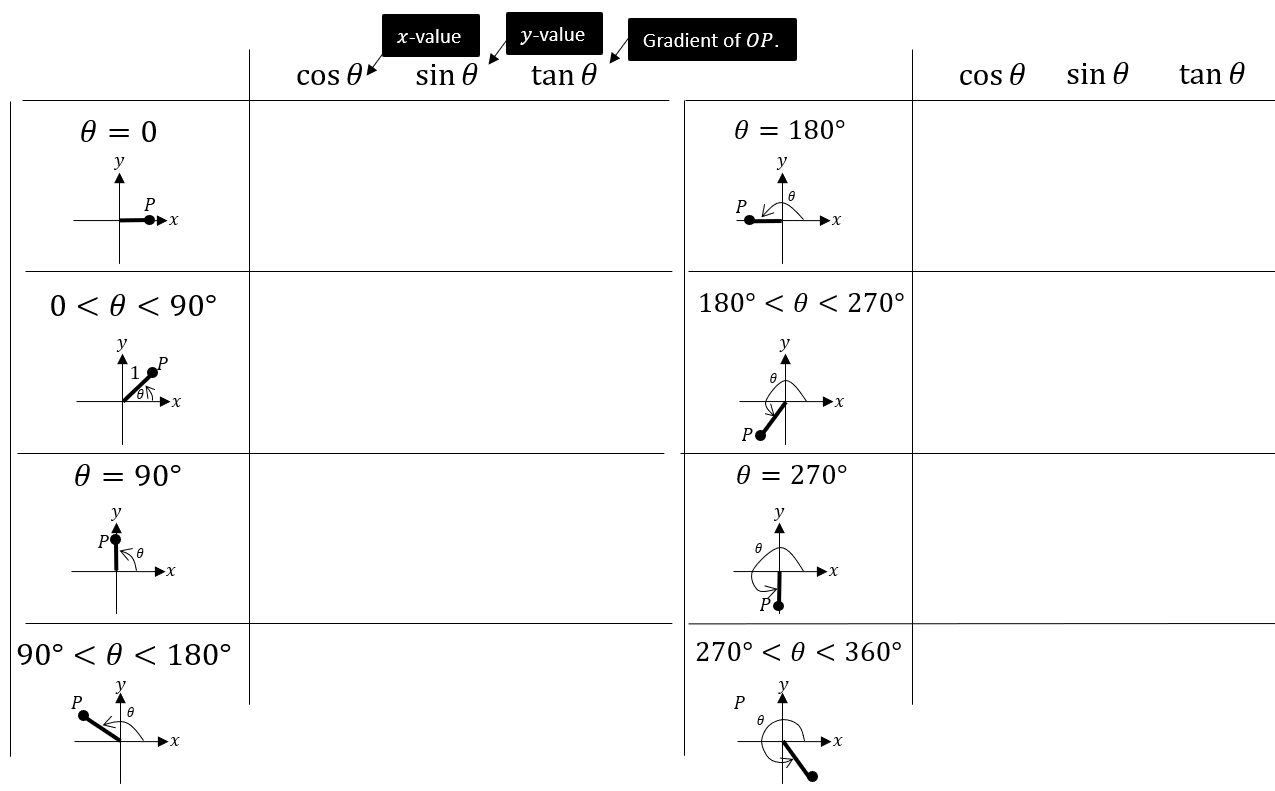
But how do we get the rest of the graph for and when ?

The point on a unit circle, such that makes an angle with the positive -axis, has coordinates .  
has gradient .

Angles are always measured **anticlockwise**.

We can consider the coordinate P as increases from 0 to …

Use the unit circle to determine each value in the table, **using either “0”, “+ve”, “-ve”, “1”, “-1” or “undefined”**.



The unit circle explains the behaviour of the trigonometric graphs beyond .

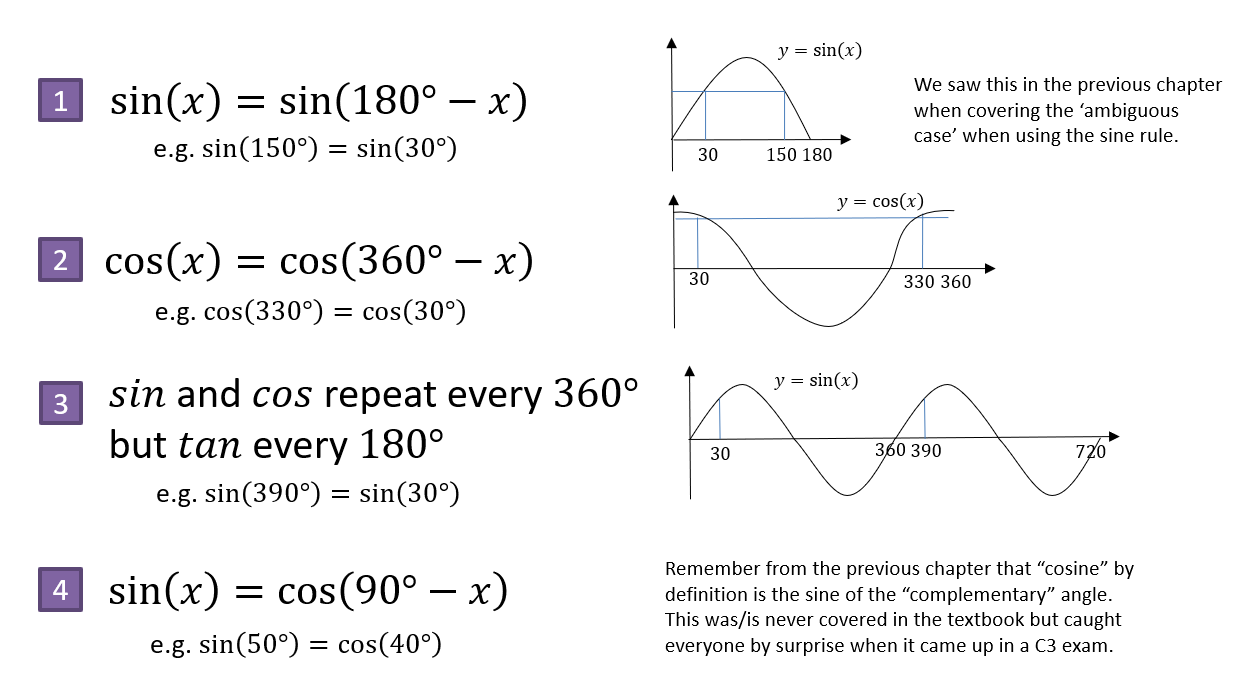
However, the easiest way to remember whether are positive or negative is to just do a **very quick sketch (preferably mentally!)** of the corresponding graph.

**Note:** The textbook uses something called ‘*CAST diagrams*’. We will not be using them in this booklet, but you may wish to look at this technique as an alternative approach to various problems in the chapter.

A Few Trigonometric Angle Laws

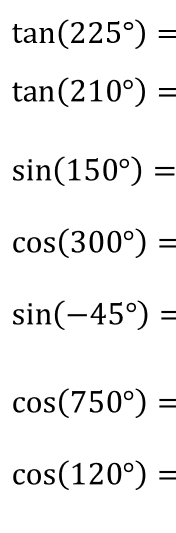
The following are all easily derivable using a quick sketch of a trigonometric graph, and are merely a convenience so you don’t always have to draw out a graph every time.

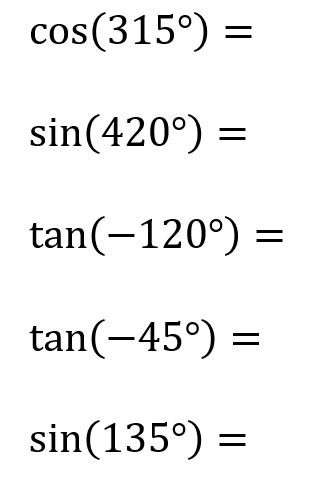
You are highly encouraged to **memorise these** so that you can do exam questions faster.



Examples

Without a calculator, work out the value of each below:





Exercise 10A and B Pg 207 and 209

AD Page 11

**Trigonometric identities**

Examples

Prove that

Prove that

Simplify

Test your understanding

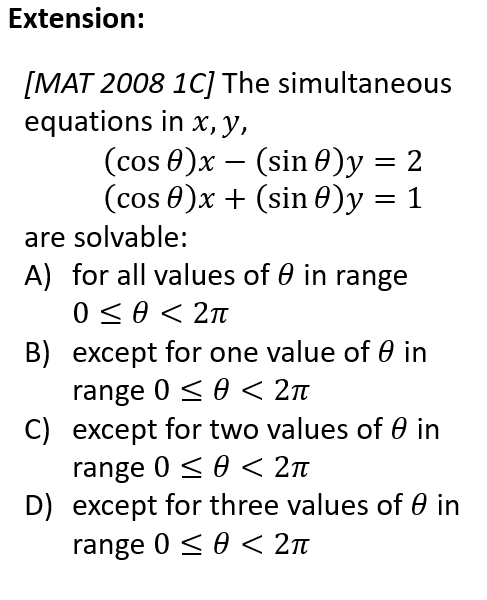
Prove that

Prove that

Prove that

Exercise 10C Pg 211/212

AD Page 11



**Solving trigonometric equations**

Solve in the interval .

Solve in the interval

Solve in the interval .

Solve in the interval .

Solve in the interval .

Solve in the interval .

Exercise 10D Pg 215/216

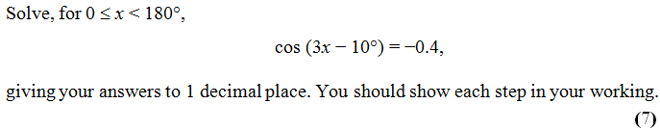
AD Page 11

**Harder equations**

Solve in the interval .

Solve in the interval .

Solve in the interval



Exercise 10E Pg 218/219

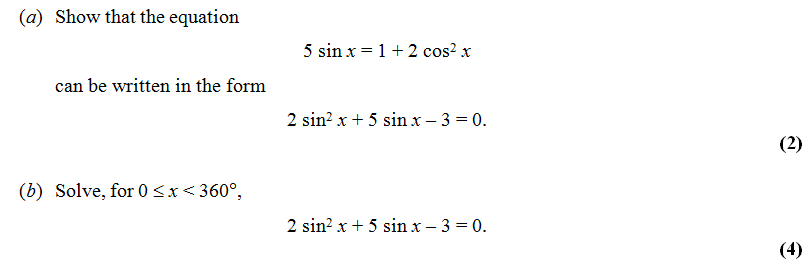
AD Page 11

**Quadratics in sin/cos/tan**

Solve in the interval .

Solve in the interval .

Solve in the interval .



Exercise 10F Pg 221/222

AD Page 11

