Unit 5: Angles and Trigonometry

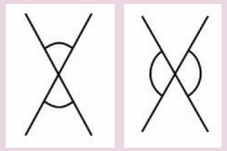
Angle Facts

Basic Angle Facts

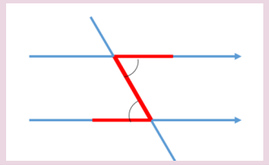
- Angles on a straight line sum to 180°
- Angles around a point sum to 360°
- Interior angles of a triangle sum to 180°
- Isosceles triangles have two sides the same and two base angles the same
- Equilateral triangles have the same sides and angles
- Interior Angles of Quadrilaterals sum to 360°

Angles in Parallel Lines

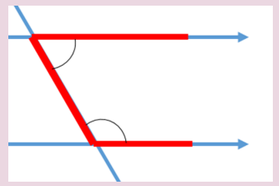
Vertically Opposite Angles are equal



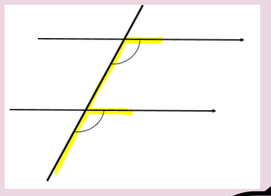
Alternate Angles are equal



Co-interior Angles sum to 180°



Corresponding Angles are equal



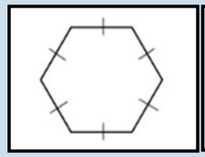
Interior and Exteri-

Interior Angles

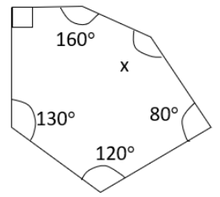
The sum of the interior angles of any polygon with n sides is (n – 2) x 180 °.

n = amount of sides

Find the sum of the interior angles of this regular Hexagon



=(n – 2) x 180
=(6 - 2) x 180
= 4 x 180 =
720°



Find the value of angle x

Sum of all angles = 4 x 180 = 720°

Sum of known angles =
90 + 160 + 130 + 120 + 80
= 580°

720° - 580° = 140°

Exterior Angles

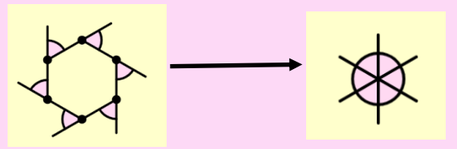
The sum of the exterior angles of a polygon will add up to 360°

An interior angle and exterior angle on a straight line will always add up to 180°

To find the size of one exterior angle of a regular polygon when given the sides we will need this formula

$$\frac{360}{n}$$

Where n is the amount of sides



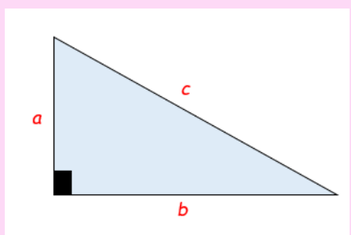
Pythagoras

The formula

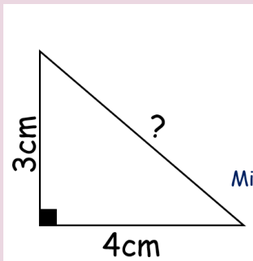
In any right-angled triangle the square of the hypotenuse is equal to the sum of the squares on the other two sides

In other words:

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

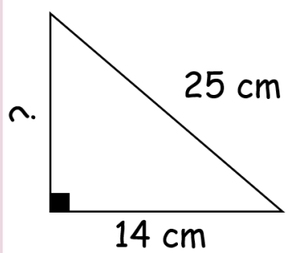


Finding a hypotenuse



$a^2 + b^2 = c^2$
$3^2 + 4^2 = c^2$
$9 + 16 = c^2$
$25 = c^2$
$5 = c$
Missing side =5cm

Finding a shorter side



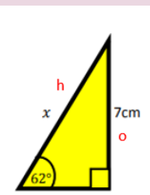
$a^2 = c^2 - b^2$
$a^2 = 25^2 - 14^2$
$a^2 = 625 - 196$
$a^2 = 429$
$a = \sqrt{429}$
a = 20.7
Missing side = 20.7cm

Trigonometry

Finding a missing side

Steps

1) Label the triangle
2) Work out which trig formula you need
3) Substitute the angle And the sides into the formula
4) Rearrange the equation To isolate the missing side
5) Put the numbers into your calculator



$\sin(62) = \frac{7}{x}$

$x\sin(62) = 7$

$x = \frac{7}{\sin(62)}$

$x = 7.9cm$

$\sin(x) = \frac{o}{h}$

$\cos(x) = \frac{a}{h}$

$\tan(x) = \frac{o}{a}$

Finding a missing angle

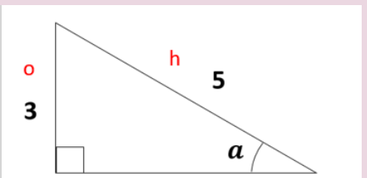
1) Label the sides

2) Decide whether you are using Sin Cos or Tan

$\sin(x) = \frac{o}{h}$ $\cos(x) = \frac{a}{h}$ $\tan(x) = \frac{o}{a}$

3) Put the values into the formula

4) Use the inverse trig button to find The size of the angle



$\sin(a) = \frac{3}{5}$ $a = \sin^{-1}\left(\frac{3}{5}\right)$

$a = 36.9°$