Angles and Triangles

Year 9 Mathematics
Mainstream

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Learning Objectives

By the end of the lesson I hope that you understand and can apply the following to a range of questions from the Year 9 Mathematics course.

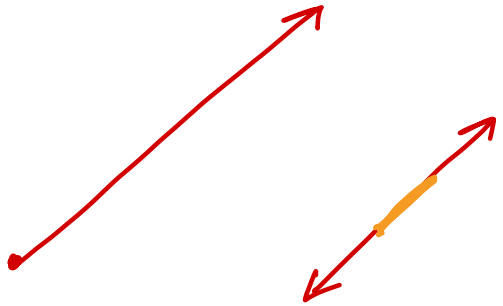
- Know what angles and triangles are
- Understand what a complementary and supplementary angle is
- Know what vertically opposite and revolution angles
- Know and apply the exterior angle theorem

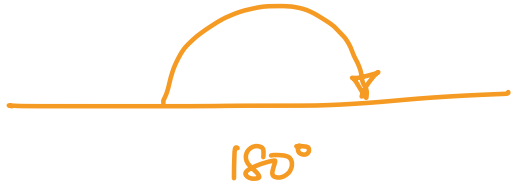
RECAP

Whilst this is a new topic in the Year 9 syllabus, it's not new content and should build on the work we have completed in previous years.

What is most important is an understanding of the language of angles.

- **Ray**: A straight line which extends from a point to infinity and beyond
- **Line**: A set of points which continue
- **Line Segment**: A section of a straight line
- **Acute angle**: between 0° and 90°
- **Right angle**: 90°
- **Straight angle**: 180°
- **Reflex angle**: between 180° and 360°
- **Revolution**: 360°
- **Complementary angles**: Add to 90°
- **Supplementary angles**: Add to 180°





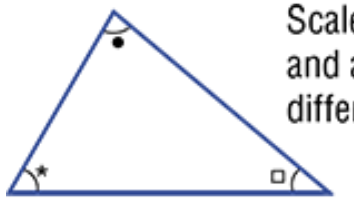
Types of triangles

Everything has to have a name and triangles are no different.

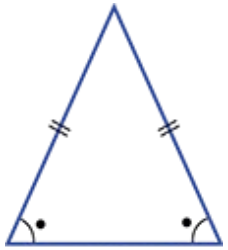
The main triangles are:

- Scalene
- Isosceles
- Equilateral, and
- Right Angled

Note: Angles in a triangle will always add to 180°

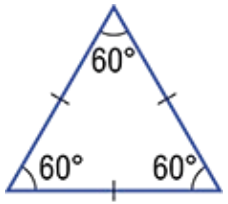


Scalene (all sides and angles are different sizes)



Isosceles (two angles equal and two sides equal)

Isosceles



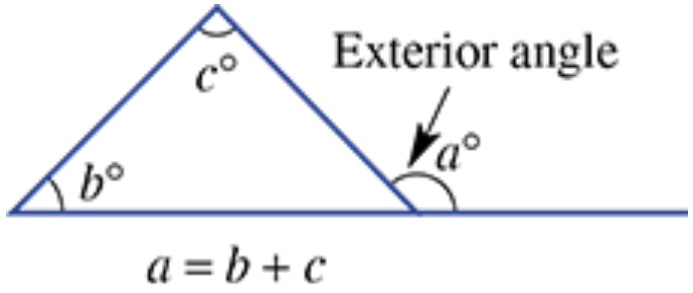
Equilateral (all angles 60° and all sides equal)

Exterior angles

Exterior means **outside**.

So it makes sense that an exterior angle is one which sits outside of a triangle (or shape).

Generally, we can use the idea that angles on a straight line add to 180° to find exterior angles (when given an interior one) or vice versa.



$a = b + c$

Finding supplementary and complementary angles

For an angle of size 47° determine the size of its:

- supplementary angle
- complementary angle.

C 90°

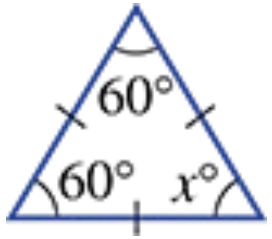
S 180°

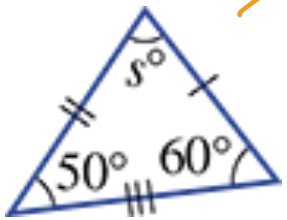
$180° - 47° = 133°$

$90° - 47° = 43°$

Finding unknown angles in triangles

Name the types of triangles shown here and determine the values of the pronumerals.





Scalene

$180 - 110°$

$s = 70°$

Equilateral

$x = 60°$

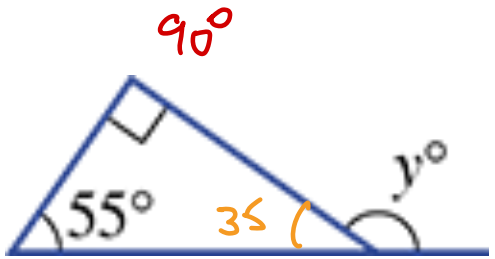
Isosceles

$180 - 120° = 60°$

$\therefore r = 30°$

Finding exterior exterior and other angles

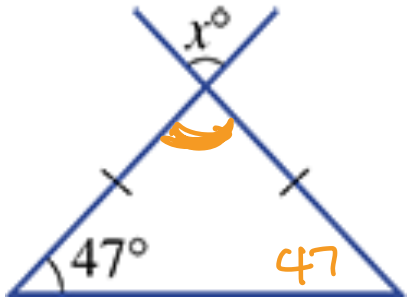
Find the value of each pronumeral. Give reasons for your answers.



$180° - 90° - 55$

$35°$

$y = 145°$



$180° - 47 - 47$

$= 86°$

$x = 86°$

Questions to complete:

The questions I would like you to complete for this lesson are:

Exercise 7A Angles and Triangles
Questions: 2, 3bcdef, 4cdeg, 5adf, 6, 8fghi, 9, 10

Extension: 13

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