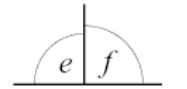
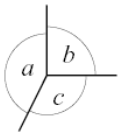
Guidance for tutors

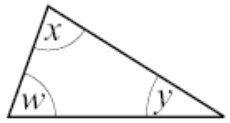
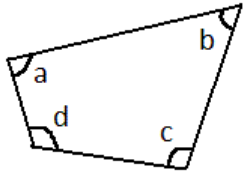
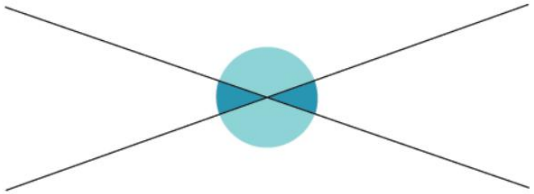
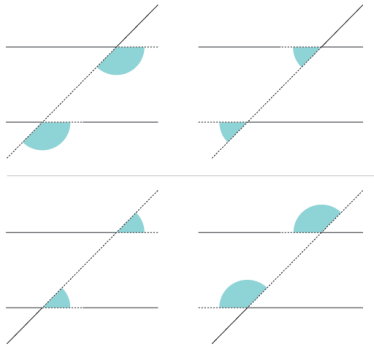
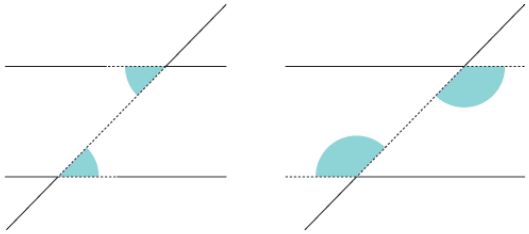
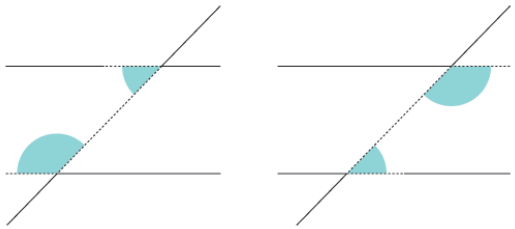
<table>
<tr><td>Outcome</td><td>SA2</td><td>Student can consistently:</td><td>Find the size of angles in simple shapes in problems involving parallel and intersecting lines (e.g. alternate and corresponding angles)</td></tr>
<tr><td>How the topic is examined</td><td colspan="3">• Examined through test paper questions.
• Questions are equally likely to appear on calculator and non-calculator papers.
• It is unlikely that questions will ask students to find a missing angle in a simple shape, it will more than likely be linked to another angle fact (e.g. a triangle within a diagram involving a pair of parallel sides)
• It is important to use exact mathematical language in an answer.</td></tr>
<tr><td>Prior knowledge</td><td colspan="3">• Students should be confident with:
○ Addition and subtraction.
• In addition questions involving this topic can have links to:
○ Finding the area of basic shapes (SLAV1)
○ Forming solving equations (AEq1)</td></tr>
<tr><td>Suggested tuition approaches</td><td colspan="3">• Students should be confident with the following angle facts.
<table><tr><th>Angles in half turn or on a straight line add up 180°</th><th>Angles in a full turn or around a point sum to 360°</th></tr><tr><td> 

$e + f = 180°$</td><td> 

$a + b + c = 360°$</td></tr></table></td></tr>
</table>

©2017 The Access Project
Company number: 07473072 | Charity number: 1143011
Registered address: Bastion House, 140 London Wall, London EC2Y 5DN

Guidance for tutors

Angles in a triangle sum to 180°	Angles in a quadrilateral add up to 360°
 $w + x + y = 180\ ^\circ$	
(Vertically) opposite angles are equal	**Corresponding angles are equal**
	
Alternate angles are equal	**Allied angles sum to 180°**
	

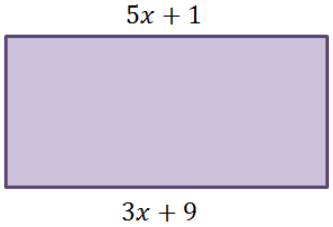
- Students should know the basic properties of different triangles and quadrilaterals.

©2017 The Access Project
Company number: 07473072 | Charity number: 1143011
Registered address: Bastion House, 140 London Wall, London EC2Y 5DN

Guidance for tutors

- http://www.cimt.org.uk/projects/mepres/book8/bk8i15/bk8_15i4.htm
- http://www.proprofs.com/sat/study-guide/Topic3/geometryM3_S3/html/4001.shtml

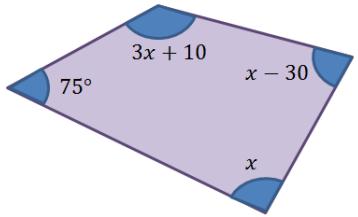
- It is important that students use exact mathematical language in their solution. For example it is not sufficient to say (angles = 180° if finding a missing angle in a triangle. Students must write that angles in a triangle add up 180°)
- When using language around parallel and intersecting lines it is important to use the exact language used above. It is not acceptable to use words like “Z angles” for alternate angles. Students will be given no marks if they do.
- Students should meet problems that have many of these angle facts combined. (See past paper questions)
- Students should write all the angles that they find on the diagram. This should then be backed up with a calculation and/or statement in the answer space. Examiners are allowed to award marks for angles shown on a diagram.
- It is common for students to be required to give reasons for all their answers.
- There are an increasing number of problems that require students to use angle properties to form and then solving an algebraic equation.



Find the value of x

The fact we are using here is that in a rectangle these two sides are equal.

$$5x + 1 = 3x + 9$$
$$(-3x)$$
$$2x + 1 = 9$$
$$(-1)$$
$$2x = 8$$
$$(\div 2)$$
$$x = 4$$



Find the value of x

The fact we are using here is that angles in a quadrilateral add up to 360°

$$5x + 55 = 360$$
$$(-55)$$
$$5x = 305$$
$$(\div 5)$$
$$x = 61$$

Common errors and misconceptions

- Students struggle with finding a missing angle in isosceles triangles. They struggle to know which two angles are the ones that are equal.
- Mistakes are made with adding and subtracting when students don’t have a calculator.
- Students confuse alternate and corresponding angles.
- Terms like “F angles” and “Z angles” are used – no marks will be given for such terms.
- Students must give full reasons when the question asks “Give reasons for your answer”.

©2017 The Access Project
Company number: 07473072 | Charity number: 1143011
Registered address: Bastion House, 140 London Wall, London EC2Y 5DN

Guidance for tutors

	• When diagrams look quite complicated this can put students off answering the question and they quickly give up. Encourage them to show all angles on the diagram. This will help.

Suggested resources	• Video tutorials
	  ○ https://www.khanacademy.org/math/basic-geo/basic-geo-angles
	• Questions
	  ○ http://www.cimt.org.uk/projects/mepres/book8/bk8i11/bk8_11i2.htm
	  ○ http://www.cimt.org.uk/projects/mepres/allgcse/bka3.pdf
	  ○ http://www.cimt.org.uk/projects/mepres/allgcse/pr3-es.pdf (pp 25-30)
	• Past GCSE Questions
	  ○ https://keshgcsemaths.files.wordpress.com/2013/11/33_angles_parallel-lines2.pdf
	  ○ https://keshgcsemaths.files.wordpress.com/2013/11/34_angles2.pdf

©2017 The Access Project
Company number: 07473072 | Charity number: 1143011
Registered address: Bastion House, 140 London Wall, London EC2Y 5DN