

Angle facts

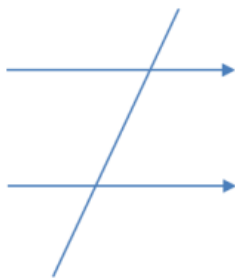
Examiners want you to explain your answers in a specific way.

Below are the main rules that are used. The key words that examiners look for are underlined:

- Angles on a line add up to 180°
- Angles around a point add up to 360°
- Angles in a triangle add up 180°
- Base angles in an isosceles triangle are equal
- Angles in a quadrilateral add up to 360°

Parallel lines:

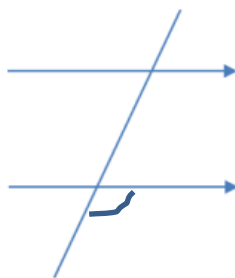
- Alternate angles are equal



Look for a z shape

You need to remember the proper name for this rule-
think of alternating current

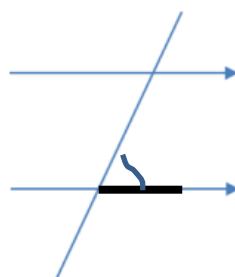
- Corresponding angles are equal



Look for a F shape

You need to remember the proper name for this rule-
think FC

- Co-interior angles add up to 180°

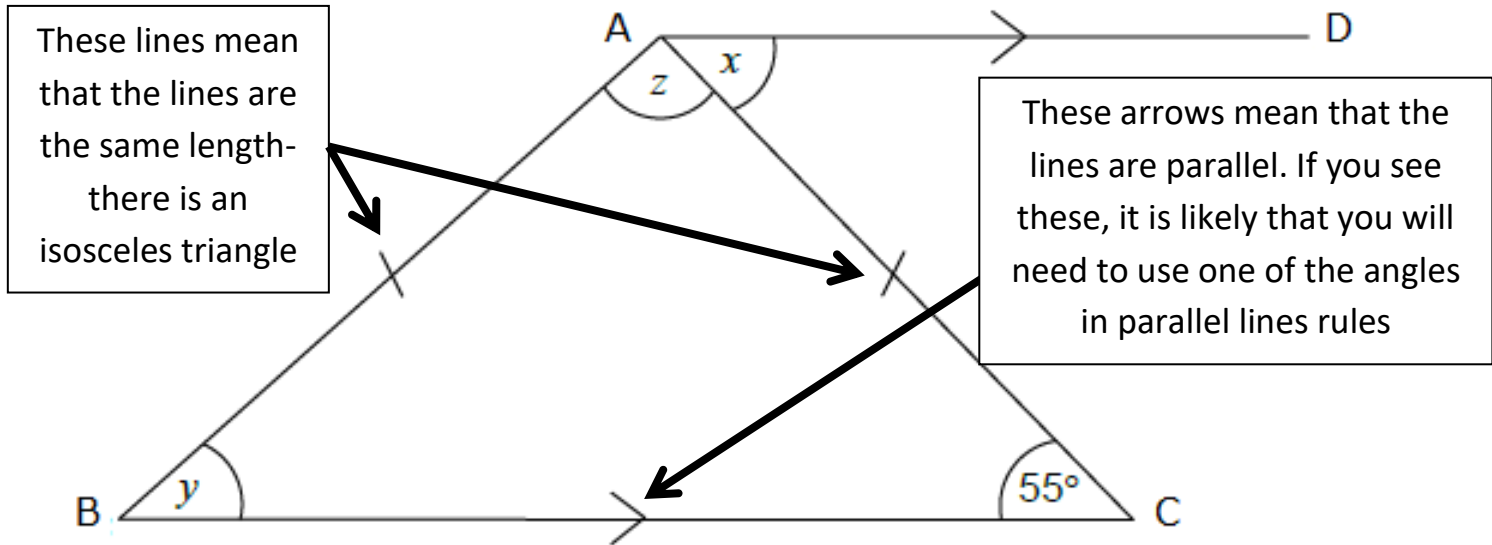


Look for a C shape. You can use alternate and
corresponding angles instead of this rule, so don't worry if
you can't remember the name.

Examples

ABC is an isosceles triangle with $AB = AC$

BC is parallel to AD and angle $BCA = 55^\circ$



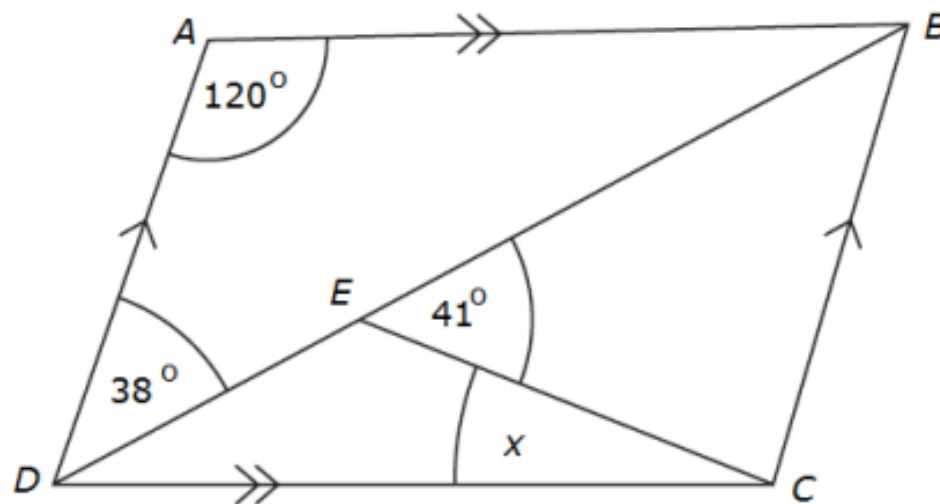
Work out the sizes of the angles marked x , y and z

$x = 55^\circ$ because alternate angles are equal

$y = 55^\circ$ because base angles in isosceles triangles are equal

$z = 70^\circ$ because angles in a triangle add up to 180°

(4)



ABCD is a parallelogram.

Angle $ADB = 38^\circ$

Angle $BEC = 41^\circ$

Angle $DAB = 120^\circ$

Calculate the size of the angle x . You must give reasons for your answer.

Angle $ABD = 180 - (120 + 38) = 22^\circ$ because angles in a triangle add up to 180°

Angle $BDC = 22^\circ$ because alternate angles are equal

Angle $DEC = 180 - 41 = 139^\circ$ because angles on a line = 180°

Angle $x = 180 - (139 + 22) = 19^\circ$ because angles in a triangle add up to 180°

(4)

Hints

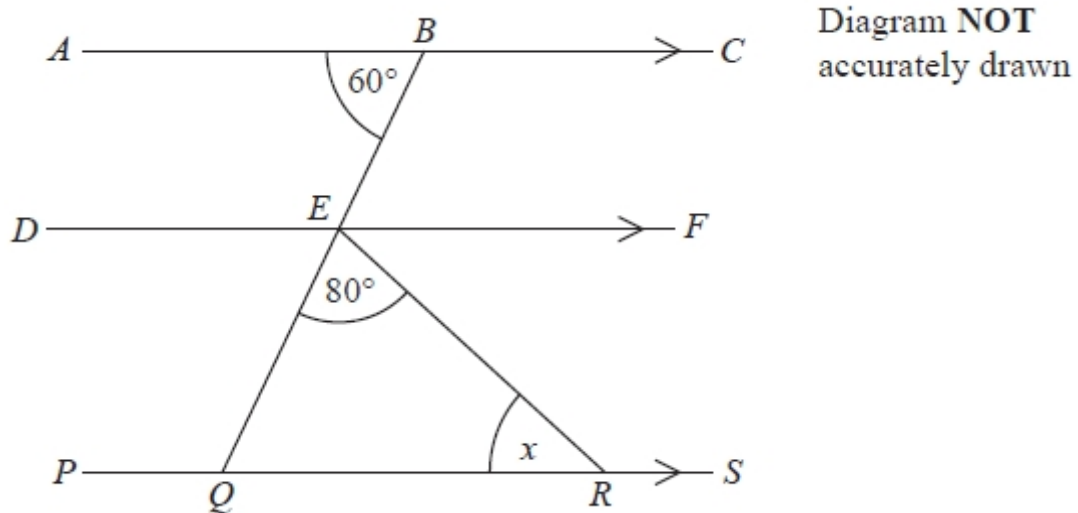
- Explain every step that you take like you are explaining it to a year 7

- Make sure it is clear which angle you are referring to- either use the 3 letters to describe them or label them with letters
- Look out for parallel lines and isosceles triangles

Mixed exam questions

Q1 June 2015 paper 1.

*



ABC , DEF and $PQRS$ are parallel lines.

BEQ is a straight line.

Angle $ABE = 60^\circ$

Angle $QER = 80^\circ$

Work out the size of the angle marked x .

Give reasons for each stage of your working.

(Total for question = 4 marks)

Q2 June 2012 paper 2.

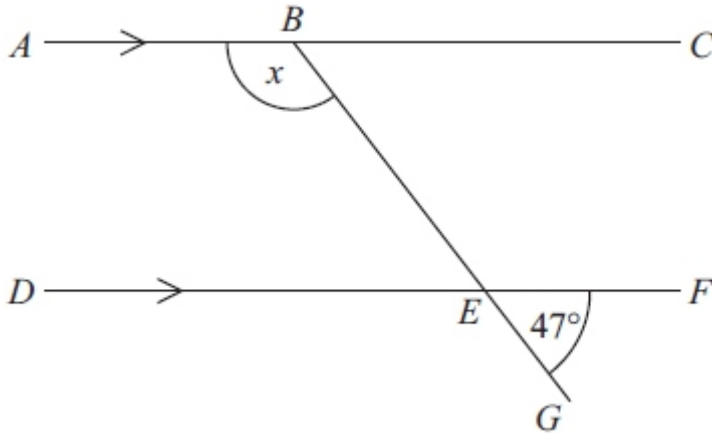


Diagram **NOT** accurately drawn

ABC and *DEF* are parallel lines.

BEG is a straight line.

Angle *GEF* = 47° .

Work out the size of the angle marked *x*.

Give reasons for your answer.

.....°
(Total for Question is 3 marks)

Q3 June 2014 paper 2.

*

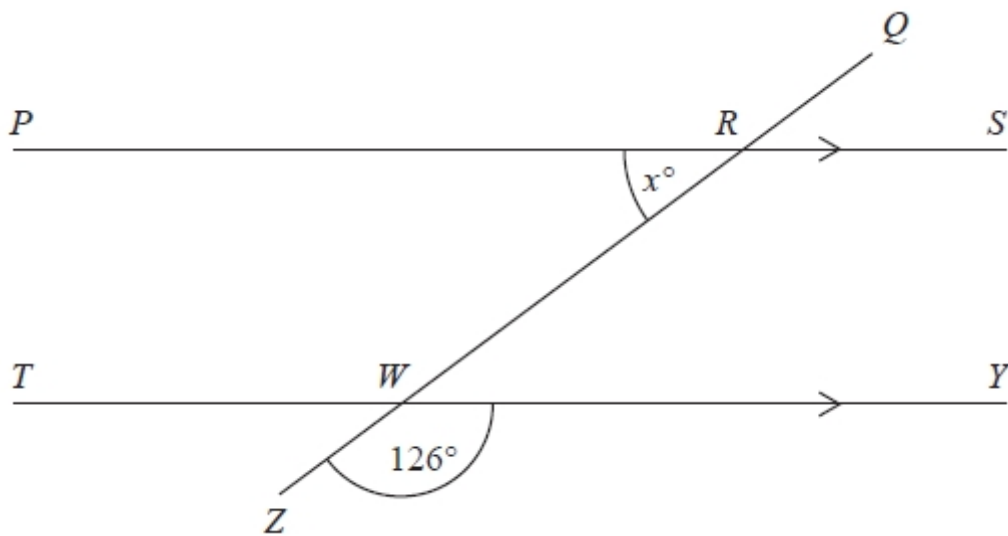


Diagram **NOT** accurately drawn

PRS and *TWY* are parallel straight lines.

QRWZ is a straight line.

Work out the value of x .

Give reasons for your answer.

(Total for Question is 3 marks)

Q4 June 2014 unit 2.

*

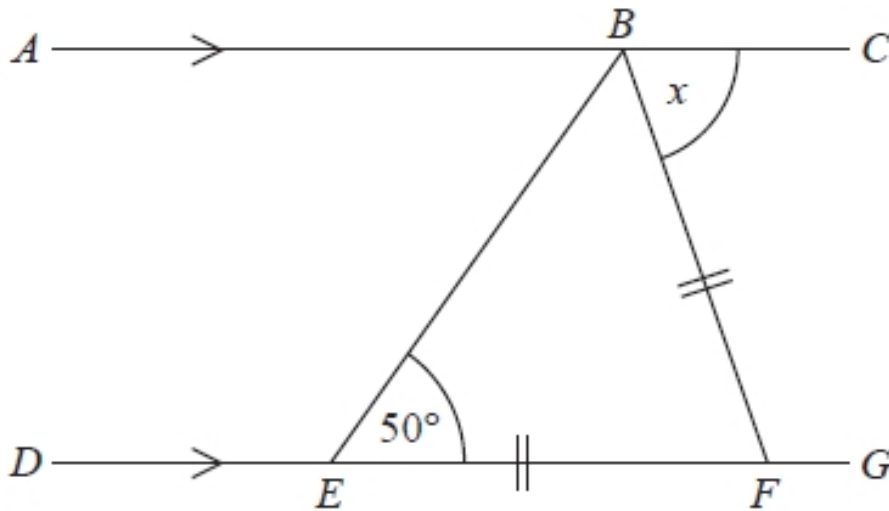


Diagram **NOT**
accurately drawn

ABC is a straight line.

$DEFG$ is a straight line.

AC is parallel to DG .

$EF = BF$.

Angle $BEF = 50^\circ$.

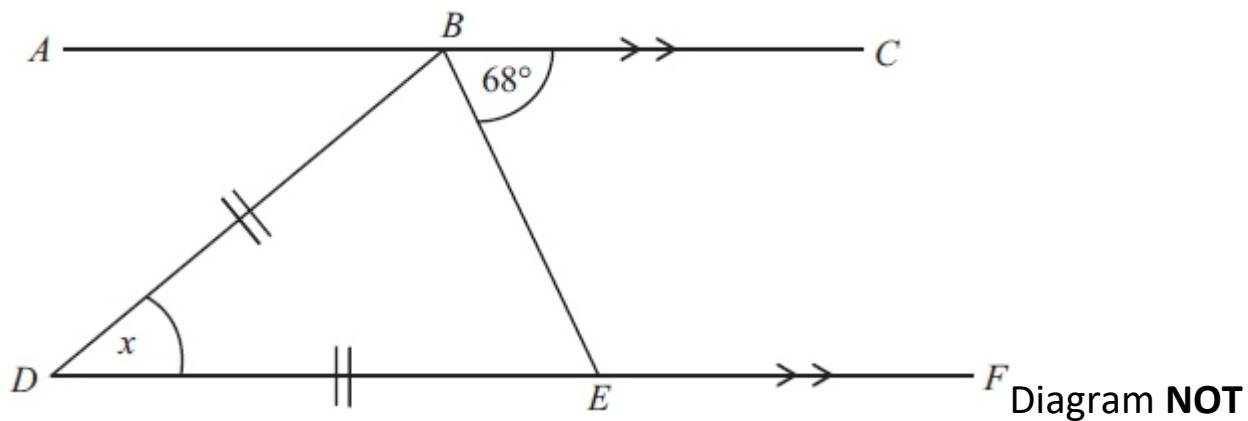
Work out the size of the angle marked x .

Give reasons for your answer.

(Total for Question is 4 marks)

Q5 June 2012 unit 2.

*



BDE is an isosceles triangle.

$DB = DE$.

The straight line *ABC* is parallel to the straight line *DEF*.

Work out the size of the angle marked *x*.

You must give reasons for each stage in your working.

(Total for Question is 4 marks)

Examiner's Report Key Notes

- Make sure that your working is clear, and that it is obvious which rules you have used for each angle
- The diagrams given will not be to scale, but they will show you if the angle that you are finding is acute or obtuse. Use this to help you to check if your answer looks sensible.
- It may help to rotate your paper. Remember that in isosceles triangles the base angles are equal, so you could move your paper to help you to see which two angles form the base.

Mark Scheme

Q1.

Answer	Mark	Notes
40° with reasons	4	<p>M1 for finding one related angle using parallel lines</p> <p>A1 for $x = 40^\circ$</p> <p>C2 for full reasons linked to appropriate method eg. <u>alternate angles</u> are equal <u>and angles</u> in a <u>triangle</u> add up to <u>180°</u> eg. <u>angles</u> on a straight <u>line</u> add up to <u>180°</u> <u>and corresponding angles</u> are equal <u>and alternate angles</u> are equal eg. <u>co-interior (allied) angles</u> add up to <u>180°</u> <u>and exterior angle</u> of a <u>triangle</u> is equal to <u>sum</u> of <u>interior opposite angles</u></p> <p>Other solutions may include reasons such as: <u>vertically opposite angles</u> are equal the sum of <u>angles</u> at a <u>point</u> is equal to <u>360°</u> (C1 (dep on M1) for one appropriate reason linked to parallel lines)</p>

Q2.

Answer	Mark	Notes
133	3	<p>M1 for $180 - 47$ A1 for 133 C1(dep on M1) for full reasons e.g. <u>angles on a straight line</u> add up to <u>180°</u> and <u>alternate angles</u> are equal</p> <p>OR <u>corresponding angles</u> are equal and <u>angles on a straight line</u> add up to <u>180°</u></p> <p>OR <u>vertically opposite angles</u> (or <u>vertically opposite angles</u>) are equal and <u>allied angles</u> (or <u>co-interior angles</u>) add up to <u>180°</u></p>

Q3.

Answer	Mark	Notes
54 with reasons	3	<p>M1 for angle RWY or angle $TWZ = 180 - 126$ ($= 54$) or angle TWR or angle $WRS = 126$ (may be marked on diagram) A1 for 54 C1 for appropriate reasons for method shown eg. <u>Angles on a straight line</u> add up to <u>180</u> and <u>Alternate angles</u> are equal</p> <p>OR <u>Corresponding angles</u> are equal and <u>Angles on a straight line</u> add up to <u>180</u></p> <p>OR <u>Vertically opposite angles</u> are equal and <u>Allied angles</u> / <u>Co-interior angles</u> add up to <u>180</u></p> <p>OR <u>Angles at a point</u> add up to <u>360</u> with other reasons as above.</p>

Q4.

Answer	Mark	Notes
80	4	<p>B1 for $EBF = 50$ or $ABE = 50$</p> <p>M1 for angles given that can lead to $x = 80$ as the next step eg $EBF = 50$ and $ABE = 50$ eg $EBF = 50$ and $BFG = 100$ eg $EBF = 50$ and $BFE = 80$ eg $EBF = 50$ and $DEB = 130$ and $ABE = 50$</p> <p>A1 cao</p> <p>C1 for stating correct reasons appropriate to their method shown</p> <p>eg Base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u>. with <u>Angles</u> in a <u>triangle</u> add up to <u>180°</u> with <u>Alternate angles</u> are equal</p> <p>eg Base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u>. with <u>Alternate angles</u> are equal with <u>Angles</u> on a <u>straight line</u> add up to <u>180°</u></p> <p>eg Base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u>. with The <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>opposite interior angles</u>. with <u>Allied angles</u> / <u>Co-interior angles</u> add up to <u>180°</u></p>

Q5.

Answer	Mark	Notes
$x = 44^\circ$	4	<p>M1 for Angle $BED = 68^\circ$ seen in the diagram or correctly used in the working space M1 for $180 - 2 \times "68"$ A1 for $x = 44^\circ$ (accept angle $BDE = 44^\circ$) [Note: 44° only seen in the body of the script without the "$x =$" gets M1M1A0]</p> <p>C1 (dep on at least M1) for <u>alternate angles</u> are equal (or equivalent) and one other reason; either <u>angles</u> in a <u>triangle</u> add to <u>180°</u> or base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u> OR for <u>allied angles</u> (or equivalent, eg co-interior) add up to <u>180°</u> and <u>angles</u> on a <u>straight line</u> add up to <u>180°</u> and one other reason; either <u>angles</u> in a <u>triangle</u> add to <u>180°</u> or base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u></p>