**Lines, Angles and Shapes (F)**

Intervention Booklet

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Useful websites:**

**www.mathswatchvle.com**

*(Video explanations and questions)*

Centre ID: twgash

Username: firstname

Password: lastname

**www.methodmaths.com**

*(Past papers online that get instantly marked)*

Centre ID: wga

Username: firstname

Password: lastname

**www.hegartymaths.com**

*(Online tutorials and quizzes)*

Login: first name and last name are backwards and case sensitive

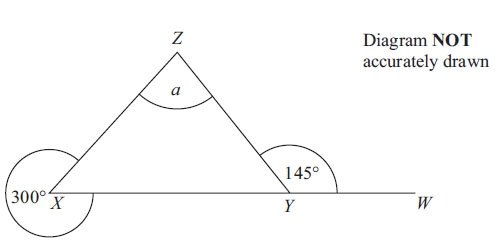
**www.bbc.co.uk/schools/gcsebitesize/maths**

**Angles in triangles, on a line and around a point**

**Things to remember:**

* Angles in a triangle sum to 180°.
* Angles on a line sum to 180°.
* Angles around a point sum to 360°.

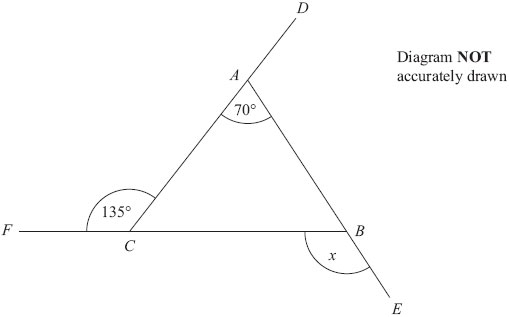
**Questions:**

**1.** XYW is a straight line.

Work out the size of the angle marked a.

You must give reasons for your answer.

**(Total for Question is 4 marks)**

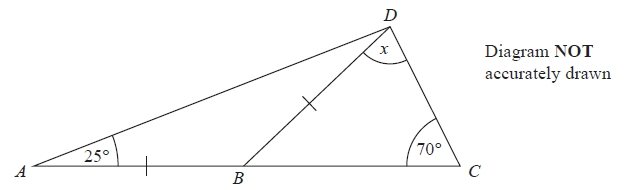


**2.** DAC, FCB and ABE are straight lines.

Work out the size of the angle marked x.

You must give reasons for your answer.

**(Total for Question is 5 marks)**

**3.** ABC is a straight line.

AB = BD

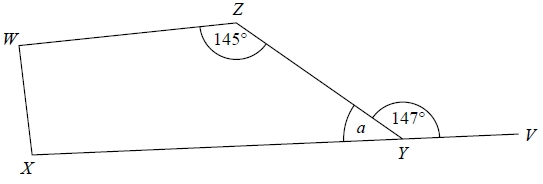
Angle BAD = 25°

Angle BCD = 70°

Work out the size of the angle marked x.

Give reasons for your answer.

**(Total for Question is 4 marks)**



**4.** WXYZ is a quadrilateral.

XYV is a straight line.

(a) (i) Find the

size of the angle marked a.

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(ii) Give a reason for your answer.

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**(2)**

Angle ZWX = angle WXY

(b) Work out the size of angle ZWX.

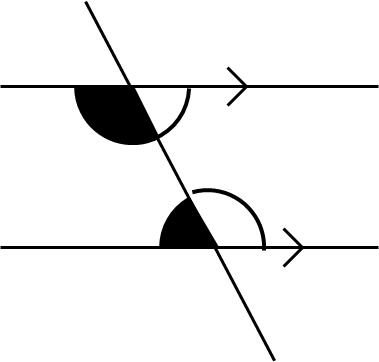
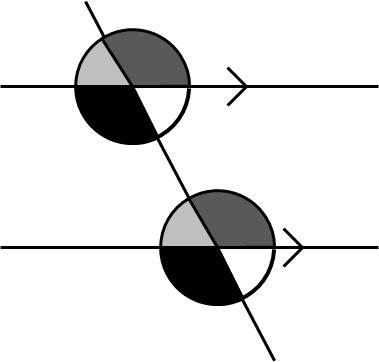
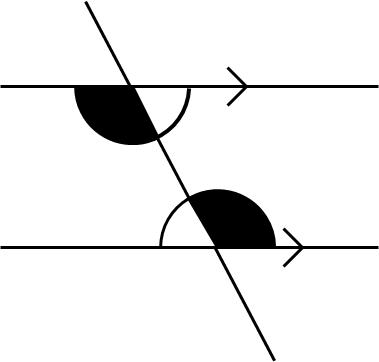
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**(Total for question = 4 marks)**

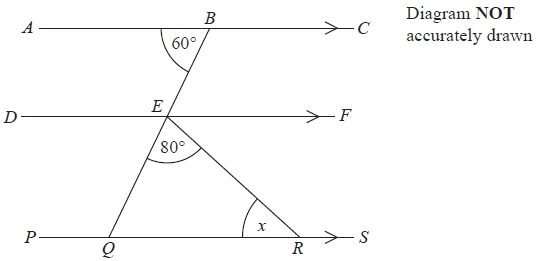
**Angles in parallel lines**

Things to remember:

C-shape co-interior F-shaped corresponding Z-shaped alternate

angles add up to 180° angles are equal angles are equal

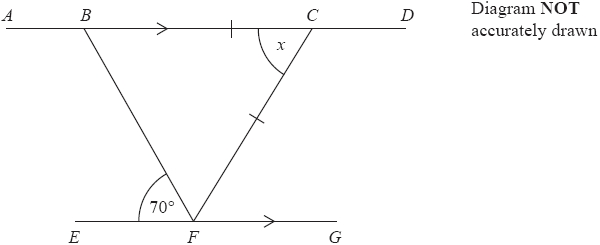
**Questions:**

**1.** Diagram not drawn accurately.  
*ABC*, *DEF* and *PQRS* are parallel lines.   
*BEQ* is a straight line.

Angle *ABE* = 60°   
Angle *QER* = 80°

Work out the size of the angle marked *x*.   
Give reasons for each stage of your working.

**(Total for question = 4 marks)**



**2.** Diagram not drawn accurately.

ABCD and EFG are parallel lines.

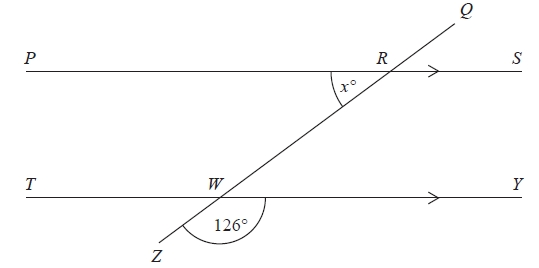
BC = CF

Angle BFE = 70°

Work out the size of the angle marked x.

Give reasons for each stage of your working.

**(Total for question = 4 marks)**

**3.** Diagram NOT accurately drawn

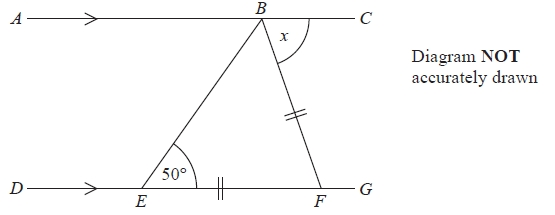
PRS and TWY are parallel straight lines.

QRWZ is a straight line.

Work out the value of x.

Give reasons for your answer.

**(Total for question = 3 marks)**

**4.** ABC is a straight line.

DEFG is a straight line.

AC is parallel to DG.

EF = BF.

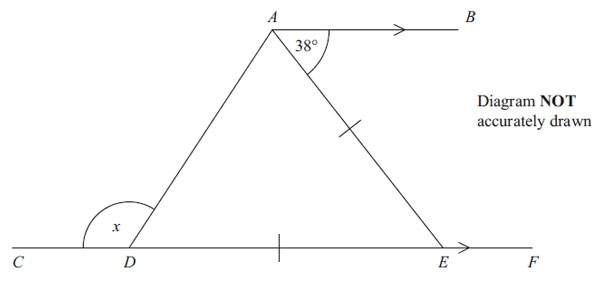
Angle BEF = 50°.

Work out the size of the angle marked x.

Give reasons for your answer.

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**(Total for Question is 4 marks)**

**5.** CDEF is a straight line.

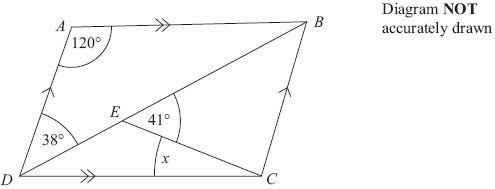
AB is parallel to CF.

DE = AE.

Work out the size of the angle marked x.

You must give reasons for your answer.

**(Total for Question is 4 marks)**

**6.** ABCD is a parallelogram.

Angle ADB = 38°.

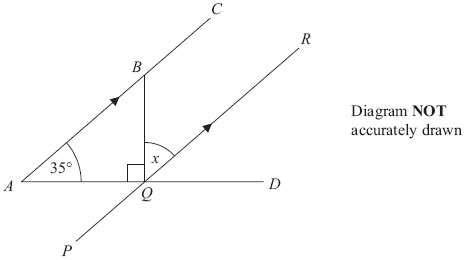
Angle BEC = 41°.

Angle DAB = 120°.

Calculate the size of angle x.

You must give reasons for your answer.

**(Total for Question is 4 marks)**

**7.** ABC, PQR and AQD are straight lines.

ABC is parallel to PQR.

Angle BAQ = 35°

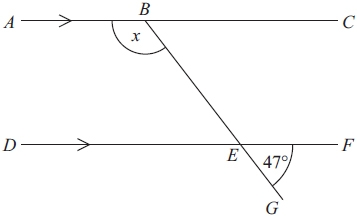
Angle BQA = 90°

Work out the size of the angle marked x.

Give reasons for each stage of your working.

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**(Total for Question is 4 marks)**

**8.** 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.

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**(Total for Question is 3 marks)**

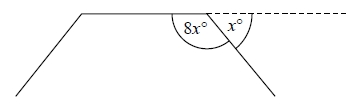
**Interior and exterior angles**

**Things to remember:**

* Interior Angles:
  + For n sides, the sum of interior angles = (n – 2) x 180
  + Each interior angle = (n – 2) x 180

n

* Exterior Angles:
  + The sum of exterior angles in any shape (or polygon) is 360°

**Questions:**

**1.** The diagram shows three sides of a regular polygon.

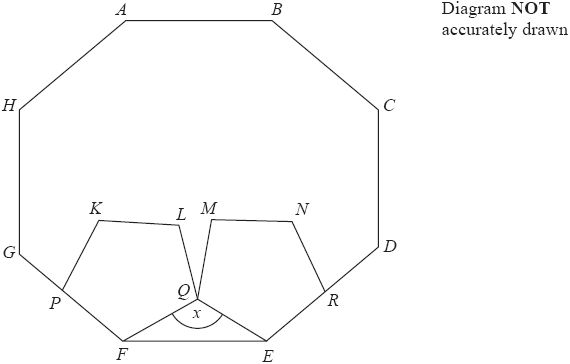
The size of each exterior angle of the regular polygon is x°.

The size of each interior angle of the regular polygon is 8x°.

Work out the number of sides the regular polygon has.

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**(Total for question = 3 marks)**

**2.** ABCDEFGH is a regular octagon.

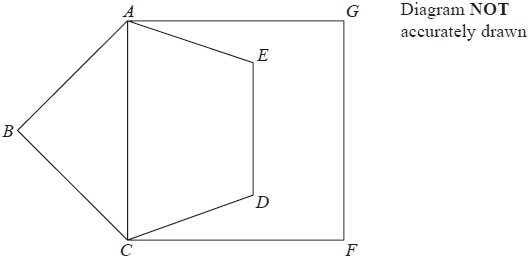
KLQFP and MNREQ are two identical regular pentagons.

Work out the size of the angle marked x.

You must show all your working.

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**(Total for question = 4 marks)**

**3.** Diagram not drawn accurately.

ABCDE is a regular pentagon.

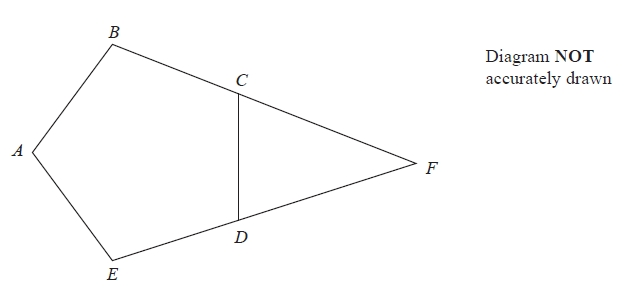
ACFG is a square.

Work out the size of angle DCF.

You must show all your working.

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**(Total for question = 4 marks)**

**4.** ABCDE is a regular pentagon.

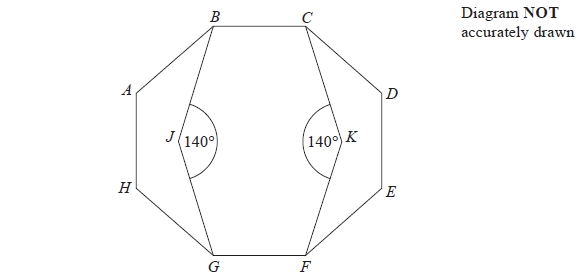
BCF and EDF are straight lines.

Work out the size of angle CFD.

You must show how you got your answer.

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**(Total for question = 3 marks)**

**5.** Diagram not drawn accurately.

ABCDEFGH is a regular octagon.

BCKFGJ is a hexagon.

JK is a line of symmetry of the hexagon.

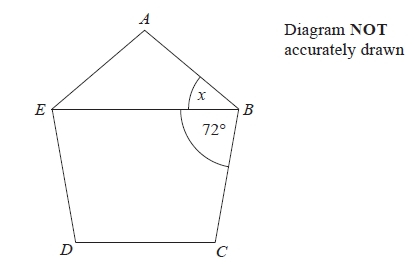
Angle BJG = angle CKF = 140°

Work out the size of angle KFE.

You must show all your working.

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**(Total for Question is 4 marks)**



**6.** Diagram not drawn accurately .

ABCDE is a regular polygon.

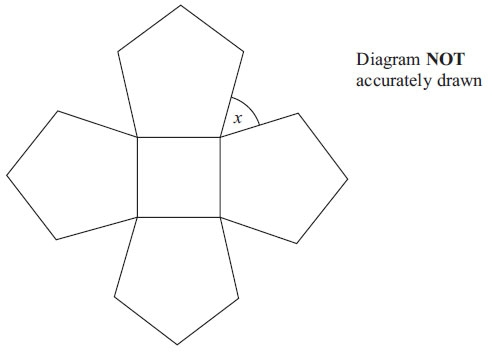
EB is a straight line.

Angle EBC = 72°.

Work out the size of the angle marked x.

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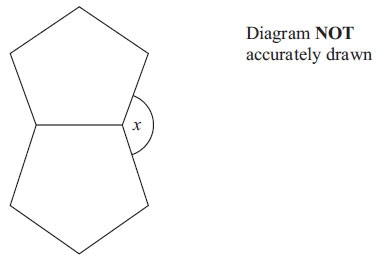
**(Total for question = 3 marks)**

**7.** The diagram shows a square and 4 regular pentagons.

Work out the size of the angle marked x.

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**(Total for question = 3 marks)**

**8.** The diagram shows two regular shapes.

Work out the size of the angle marked x.

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**(Total for Question is 3 marks)**

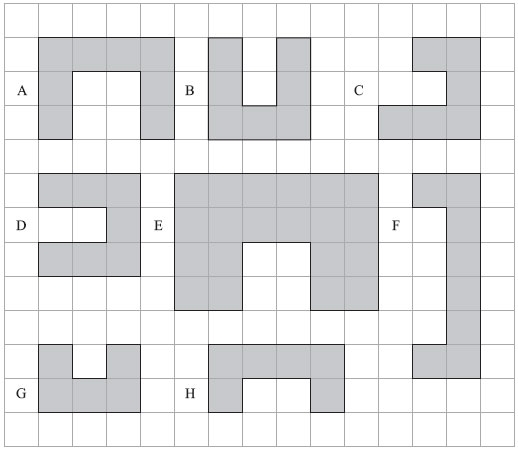
**Proofs of congruence and similarity**

**Things to remember:**

* To prove congruence, look for:
  + Side, angle, side
  + Angle, side, angle
  + Side, side, side, or
  + Right-angle, hypotenuse, (other) side

**Questions:**

**1.** These shapes have been drawn on a grid of centimetre squares.



(a) (i) Write down the letters of a pair of shapes that are congruent.

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(ii) Write down the letters of a different pair of shapes that are similar.

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**(2)**

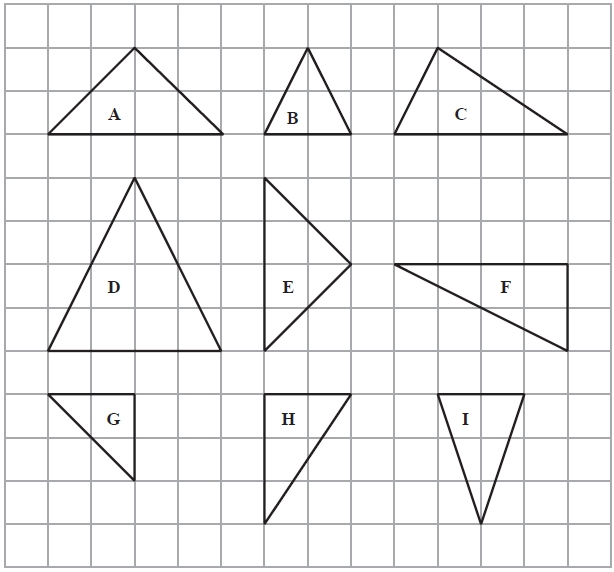
(b) Find the perimeter of shape D.

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**(1)**

**(Total for Question is 3 marks)**

**2.** Here are some triangles drawn on a grid.



Two of these triangles are congruent.

(a) Write down the letters of these triangles.

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**(1)**

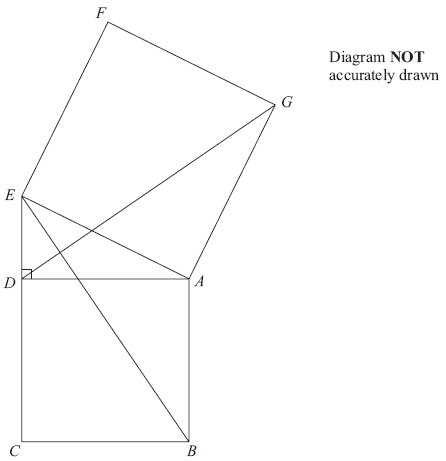
One of the triangles is similar to triangle **B**.

(b) Write down the letter of this triangle.

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**(1)**

**(Total for Question is 2 marks)**

**3.** Diagram not drawn accurately.

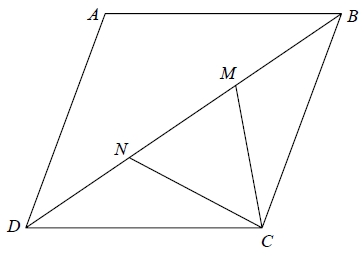
In the diagram,

*ADE* is a right-angled triangle,

*ABCD* and *AEFG* are squares.

Prove that triangle *ABE* is congruent to triangle *ADG*.

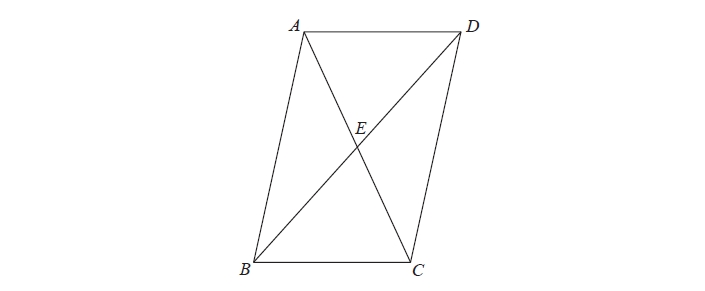
**(Total for Question is 3 marks)**

**4.** *ABCD* is a rhombus.

*M* and *N* are points on *BD* such that *DN* = *MB*.

Prove that triangle *DNC* is congruent to triangle *BMC*.

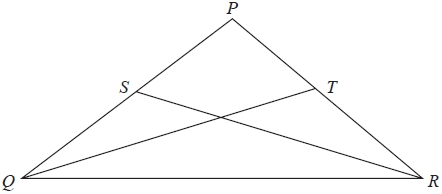
**(Total for question = 3 marks)**

**5.** *ABCD* is a parallelogram.

*E* is the point where the diagonals *AC* and *BD* meet.

Prove that triangle *ABE* is congruent to triangle *CDE*.

**(Total for question = 3 marks)**

**6.** *PQ* = *PR*.   
*S* is the midpoint of *PQ*.   
*T* is the midpoint of *PR*.

Prove triangle *QTR* is congruent to triangle *RSQ*.

**(Total for question is 3 marks)**