Edexcel GCSE
Mathematics (Linear) – 1MA0

Congruent Triangles

Materials required for examination	Items included with question papers
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser. Tracing paper may be used.	Nil

Instructions

Use black ink or ball-point pen.
Fill in the boxes at the top of this page with your name, centre number and candidate number.
Answer all questions.
Answer the questions in the spaces provided – there may be more space than you need.
Calculators must not be used.

Information

The total mark for this paper is 100.
The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.
Questions labelled with an asterisk (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.
Keep an eye on the time.
Try to answer every question.
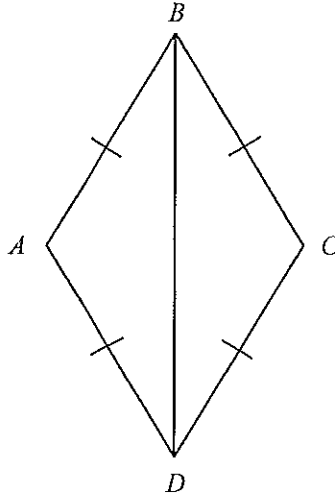Check your answers if you have time at the end.

1.

Diagram **NOT** accurately drawn

In the diagram, $AB = BC = CD = DA$.

Prove that triangle ADB is congruent to triangle CDB.

$AB = CD$ (Given)

$AD = BC$ (Given)

BD is common in both triangles.
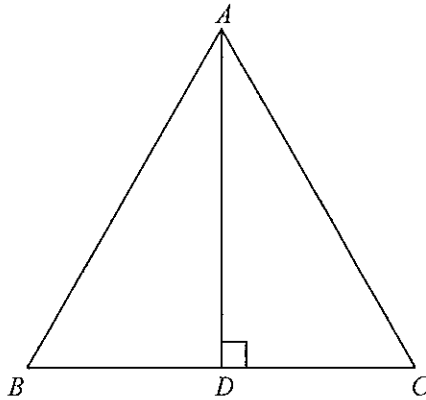
SSS ∴ triangles are congruent

(Total 3 marks)

2.

Diagram **NOT** accurately drawn

ABC is an equilateral triangle.
D lies on *BC*.
AD is perpendicular to *BC*.

(a) Prove that triangle *ADC* is congruent to triangle *ADB*.

AD is common in both triangles

$A\hat{D}C = A\hat{D}B$ both 90° (perpendicular meets line at 90°)

AB = AC (sides in equilateral triangle are equal)

RHS ∴ triangles are congruent

(3)

(b) Hence, prove that $BD = \dfrac{1}{2}AB$.

BD + CD = BC
As triangles are congruent   BD = CD = ½ BC
BC = AB ∴ BD = ½ AB
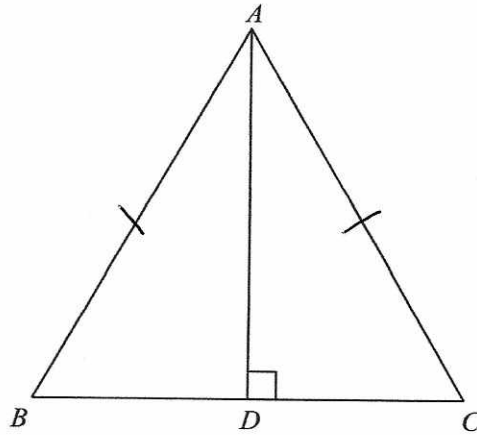
(2)

(Total 5 marks)

3

3.

Diagram **NOT** accurately drawn

ABC is an equilateral triangle.
D lies on *BC*.
AD is perpendicular to *BC*.

Prove that triangle *ADC* is congruent to triangle *ADB*.

Length AB = AC   Both sides of an
(Hypotonuse)   equilateral triangle
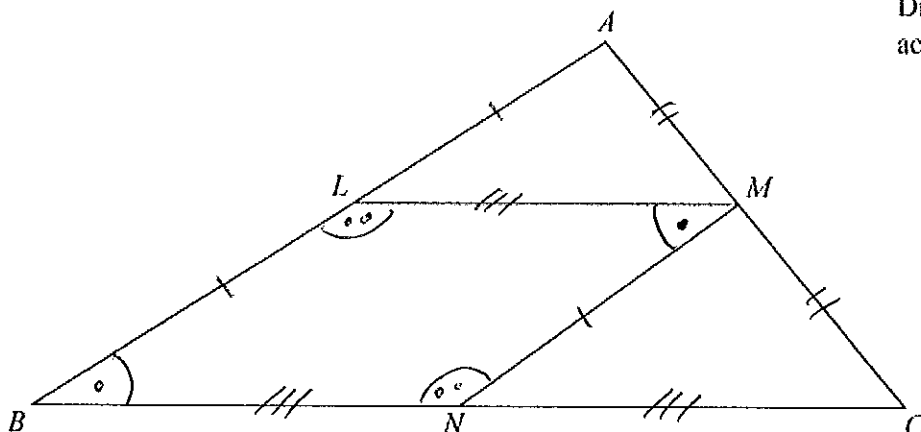
Length AD is common to both triangles
(S)

ADC = ADB   (Both 90° as AD is perpendicular
(R)   to BC)

ADC is congruent to ADB   R H S

(Total 3 marks)

4

4.

Diagram NOT
accurately drawn

The diagram shows a triangle *ABC*.

LMNB is a parallelogram where
    L is the midpoint of *AB*,
    M is the midpoint of *AC*,
and *N* is the midpoint of *BC*.

Prove that triangle *ALM* and triangle *MNC* are congruent.
You must give reasons for each stage of your proof.

$BL = AL$ (L is midpoint)

$BL = MN$ (opposite sides in parallelogram)

∴ $\underline{AL = MN}$

$BN = CN$ (N is midpoint)

$BN = LM$ (opposite sides in parallelogram)

∴ $\underline{CN = LM}$

$\underline{AM = MC}$ (M is midpoint)

SSS ∴   triangles are congruent

(Total 3 marks)

5