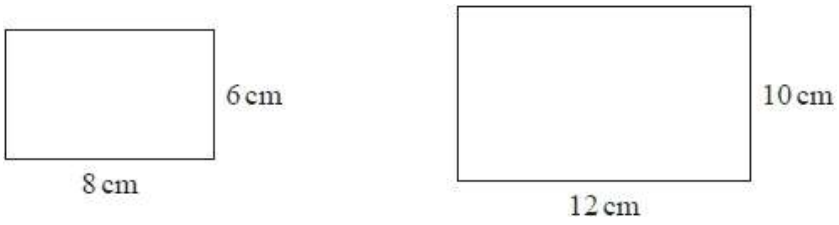
GCSE QUESTIONS

Q1. NON-CALCULATOR

Here are two rectangles.



Jim says "The two rectangles are similar because 8 + 4 = 12 and 6 + 4 = 10".

Is Jim correct? Explain your answer.

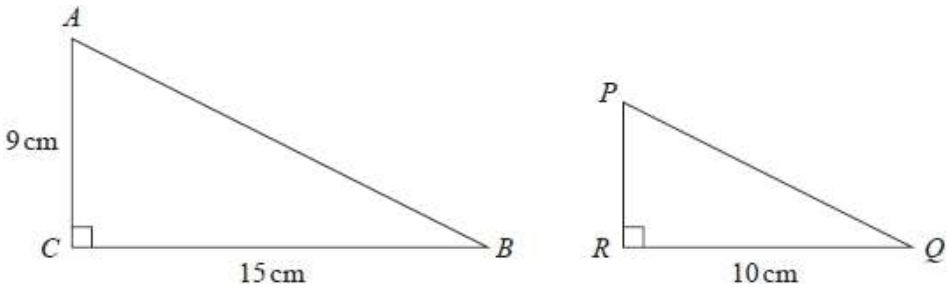
.....

.....

(Total for question = 1 mark)

Q2. NON-CALCULATOR

ABC and *PQR* are similar right-angled triangles.



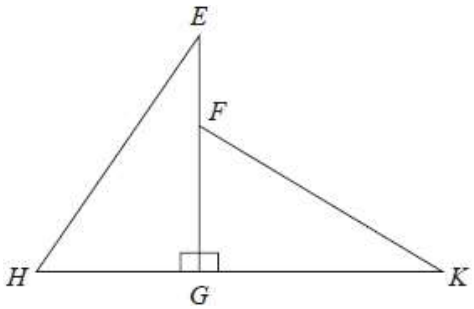
angle *ABC* = angle *PQR*

(a) Work out the length of *PR*.

..... cm

(2)

Triangle *EGH* is congruent to triangle *KGF*.



HK = 10 cm.
HG = 4 cm.

(b) Work out the length of *EF*.

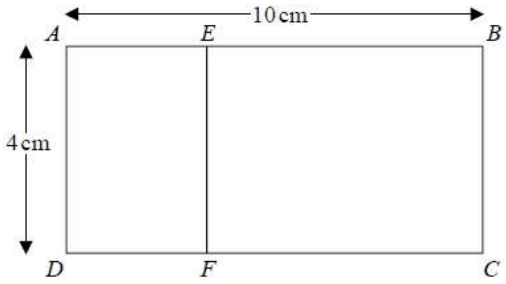
..... cm

(2)

(Total for question = 4 marks)

Q3. NON-CALCULATOR

Rectangle *ABCD* is mathematically similar to rectangle *DAEF*.



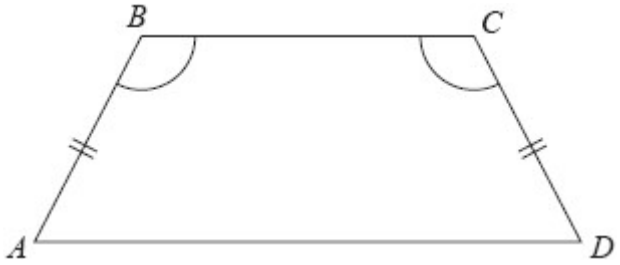
AB = 10 cm.
AD = 4 cm.

Work out the area of rectangle *DAEF*.

..... cm^2

(Total for question = 3 marks)

Q4. NON-CALCULATOR



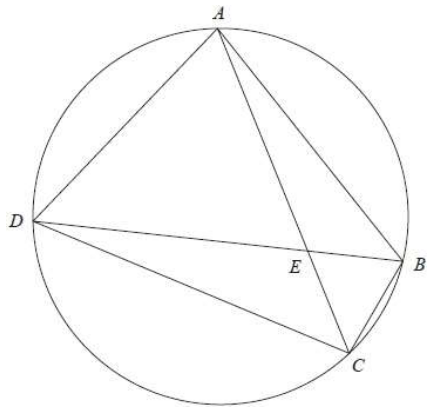
ABCD is a quadrilateral.

AB = *CD*.
Angle *ABC* = angle *BCD*.

Prove that *AC* = *BD*.

(Total for question = 4 marks)

Q5. NON-CALCULATOR



A, *B*, *C* and *D* are four points on a circle.

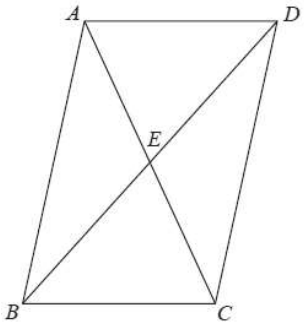
AEC and *DEB* are straight lines.

Triangle *AED* is an equilateral triangle.

Prove that triangle *ABC* is congruent to triangle *DCB*.

(Total for question = 4 marks)

Q6. NON-CALCULATOR



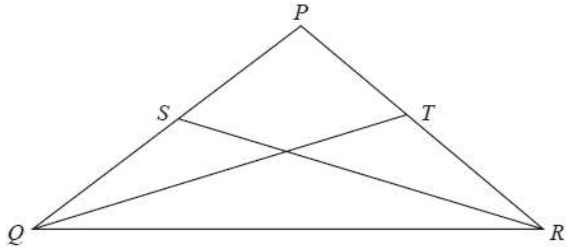
ABCD is a parallelogram.

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)

Q7. NON-CALCULATOR

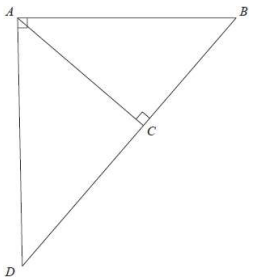


PQ = *PR*.
S is the midpoint of *PQ*.
T is the midpoint of *PR*.

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

(Total for question is 3 marks)

Q8. NON-CALCULATOR



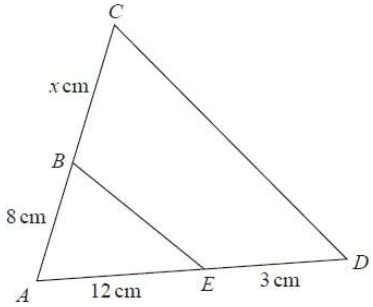
ABD is a right-angled triangle.

C is the point on *BD* such that angle *ACB* = 90°.

Prove that triangle *ABD* is similar to triangle *CBA*.

(Total for question = 3 marks)

Q9. NON-CALCULATOR

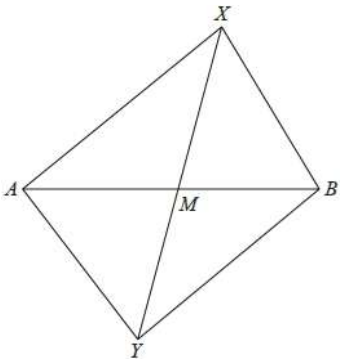


The two triangles in the diagram are similar.

There are two possible values of *x*. Work out each of these values.
State any assumptions you make in your working.

(Total for question = 5 marks)

Q10. NON-CALCULATOR



The diagram shows a quadrilateral *XBYA*.

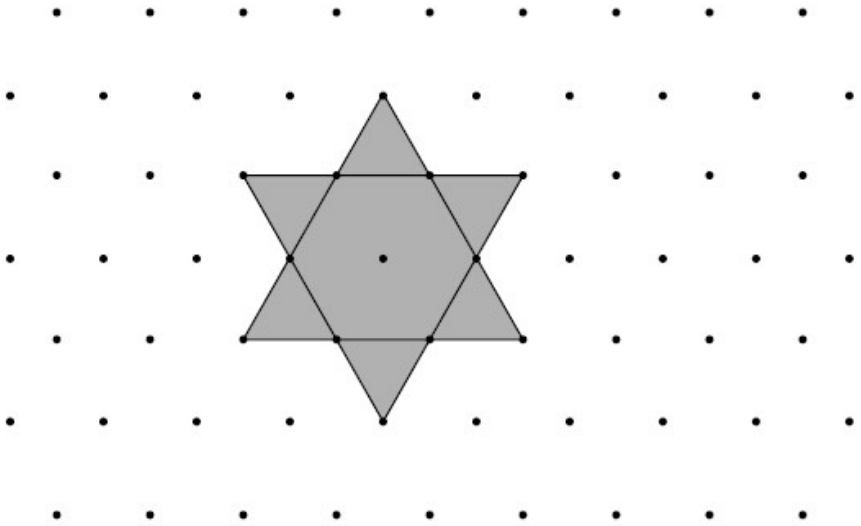
The diagonals *AB* and *XY* intersect at the point *M*.

Given that the area of triangle *AXB* is equal to the area of triangle *AYB*, prove that *XY* is bisected by *AB*.

(Total for question = 4 marks)

Q11. CALCULATOR ALLOWED

Here is a star shape.



The star shape is made from a regular hexagon and six congruent equilateral triangles.

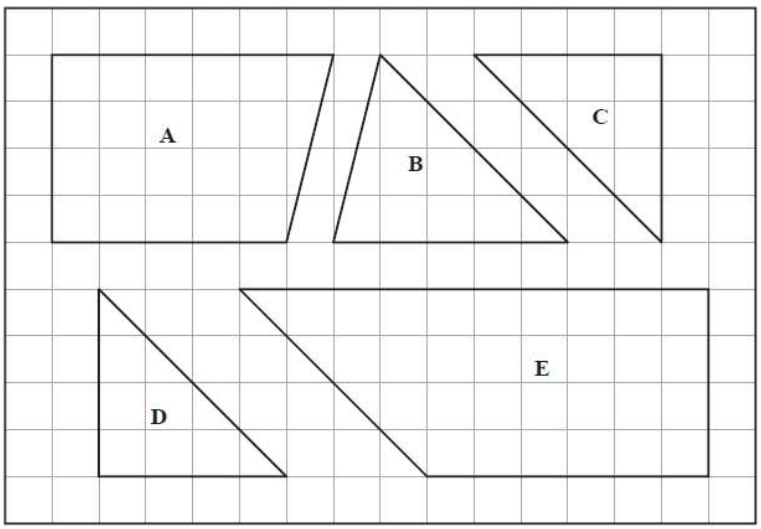
The area of the star shape is 96 cm^2. Work out the area of the regular hexagon.

..... cm^2

(Total for question = 2 marks)

Q12. CALCULATOR ALLOWED

The diagram shows five shapes on a grid.



(a) Write down the name of shape **E**.

.....

(1)

Two of the shapes are congruent.

(b) Write down the letters of these two shapes.

..... and .....

(1)

(Total for question = 2 marks)

Q13. CALCULATOR ALLOWED

The smallest angle of a triangle is 25º
The triangle is enlarged by scale factor 3

Ben says "The smallest angle of the enlarged triangle is 75º because 25 × 3 = 75"

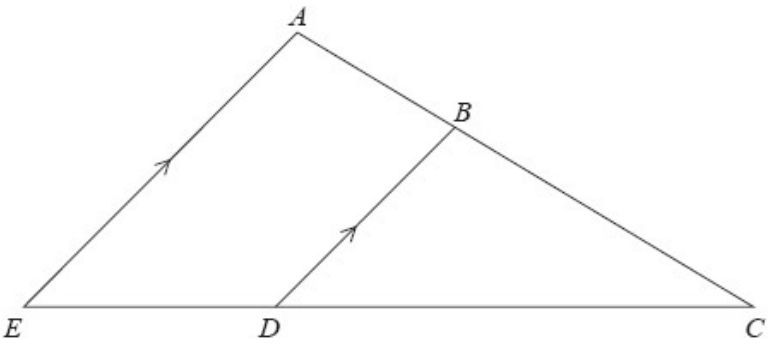
Is Ben right? Explain your answer.

.....

.....

(Total for question = 1 mark)

Q14. CALCULATOR ALLOWED



ABC and *EDC* are straight lines.
EA is parallel to *DB*.

EC = 8.1 cm.
DC = 5.4 cm.
DB = 2.6 cm.

(a) Work out the length of *AE*.

..... cm

(2)

AC = 6.15 cm.

(b) Work out the length of *AB*.

..... cm

(2)

(Total for question = 4 marks)

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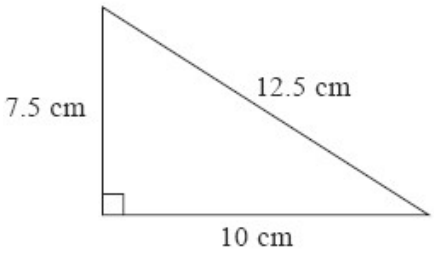
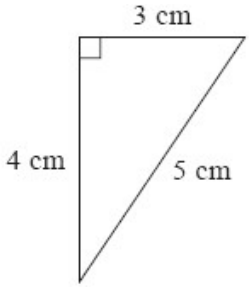
Q15. CALCULATOR ALLOWED



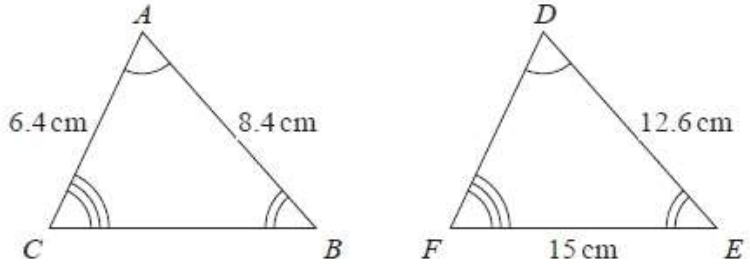


Show that these two triangles are mathematically similar.

(Total for question = 2 marks)

Q16. CALCULATOR ALLOWED

Triangle *ABC* and triangle *DEF* are similar.



(a) Work out the length of *DF*.

.....cm

(2)

(b) Work out the length of *CB*.

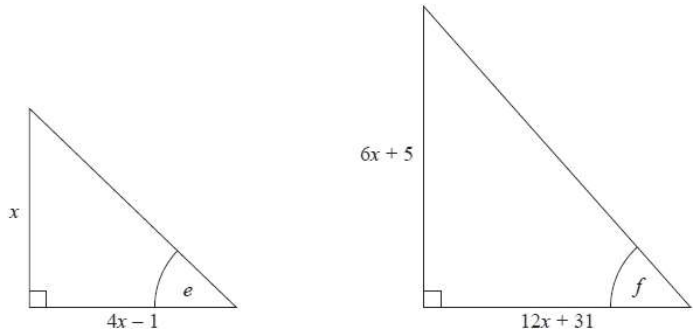
.....cm

(2)

(Total for question = 4 marks)

Q17. CALCULATOR ALLOWED

Here are two right-angled triangles.



Given that

tan *e* = tan *f*

find the value of *x*.

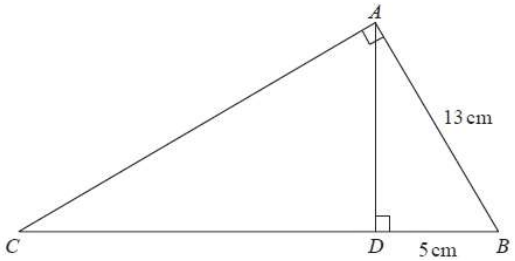
You must show all your working.

.....

(Total for question = 5 marks)

Q18. CALCULATOR ALLOWED

ABC and *ABD* are two right-angled triangles.



Angle *BAC* = angle *ADB* = 90°

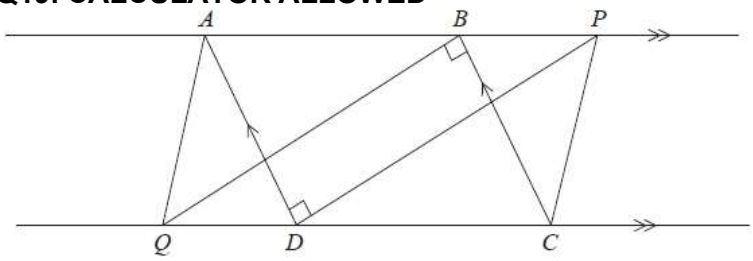
AB = 13 cm
DB = 5 cm

Work out the length of *CB*.

..... cm

(Total for question is 3 marks)

Q19. CALCULATOR ALLOWED



ABCD is a parallelogram.
ABP and *QDC* are straight lines.
Angle *ADP* = angle *CBQ* = 90°

(a) Prove that triangle *ADP* is congruent to triangle *CBQ*.

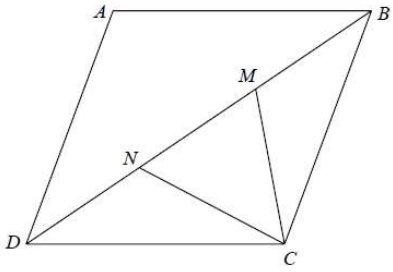
(3)

(b) Explain why *AQ* is parallel to *PC*.

(2)

(Total for question = 5 marks)

Q20. CALCULATOR ALLOWED



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)