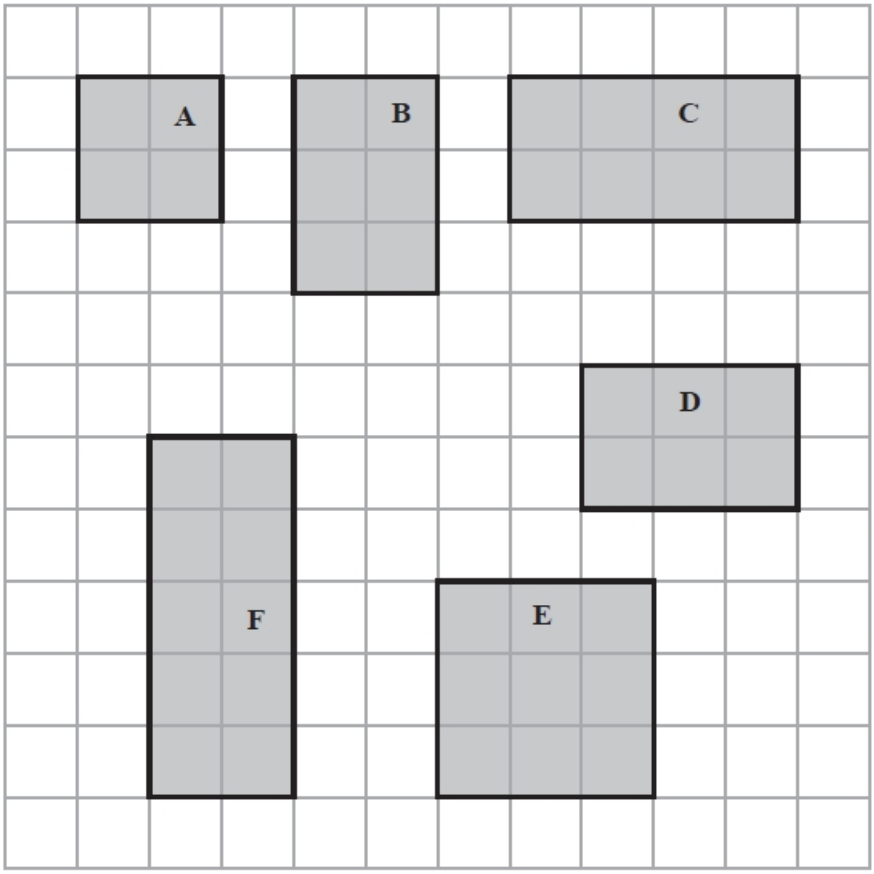
G165 Similarity and congruence

Q1.

Here are six shapes drawn on a centimetre grid.



Two of the shapes are congruent.

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

..... and .....

(1)

One of the shapes is similar to shape **A**.

(b) Write down the letter of this shape.

.....

(1)

(c) Find the area of shape **F**.

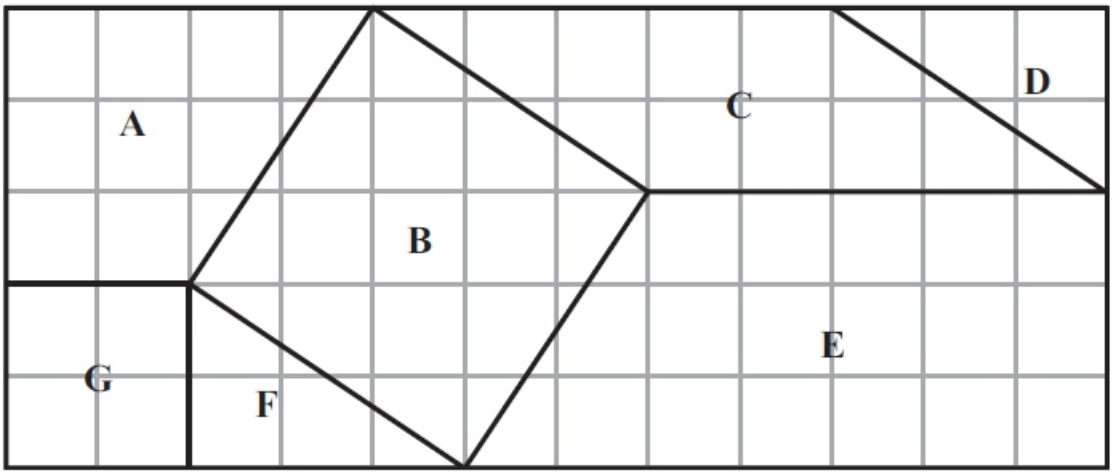
..... cm^2

(1)

(Total for question = 3 marks)

Q2.

The diagram shows 7 shapes, **A**, **B**, **C**, **D**, **E**, **F** and **G**, on a centimetre square grid.



(a) What is the mathematical name of shape **E**?

.....

(1)

(b) Write down the letters of the two shapes which are congruent.

..... and .....

(1)

(c) Mark an obtuse angle on one of the shapes.
Label your angle *x*.

(1)

(d) How many lines of symmetry has shape **B**?

.....

(1)

(e) Work out the area of shape **C**.

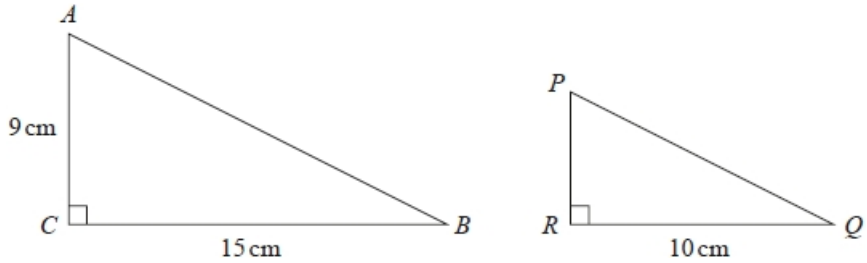
.....cm^2

(2)

(Total for question = 6 marks)

Q3.

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



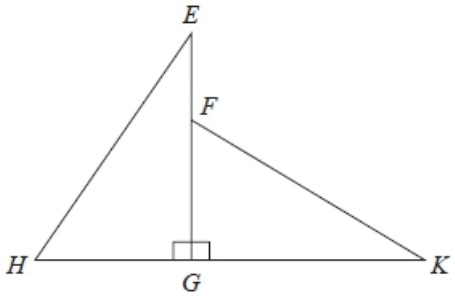
angle *ABC* = angle *PQR*

(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)

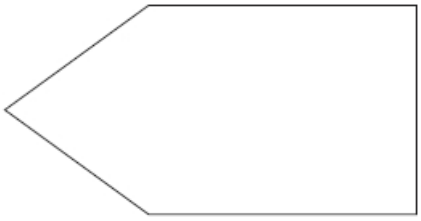
Q4.

(a) Write down the mathematical name of a polygon with 5 sides.

.....

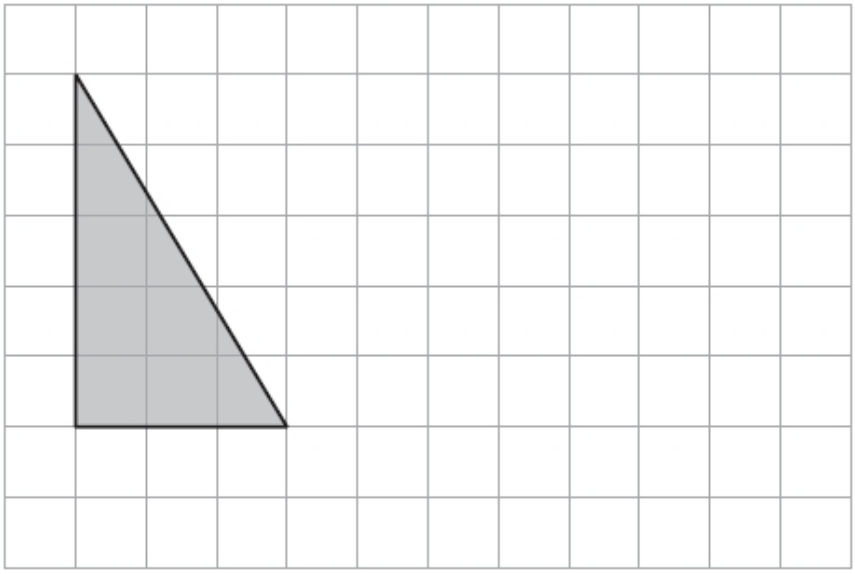
(1)

(b) On the diagram, mark with arrows (>>) a pair of parallel lines.



(1)

(c) On the grid below, draw a triangle that is congruent to the shaded triangle.

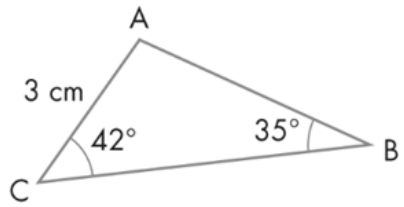


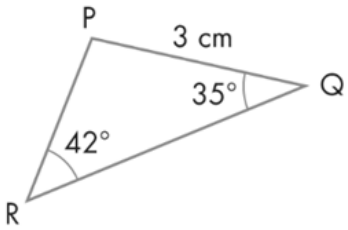
(1)

(Total for question = 3 marks)

Q5.

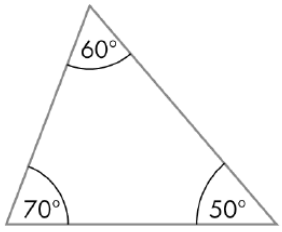
Amal says that these two triangles are congruent because two angles and a side are the same.
Show that she is wrong.

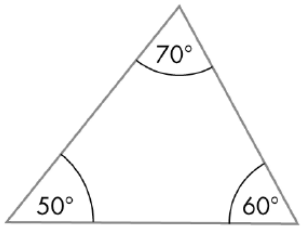




(Total for Question is 4 marks)

Q6.





not drawn accurately

Alan says that these two triangles must be congruent.

Bob disagrees and says they might be congruent.

Claire says they cannot be congruent.

Who is correct? Give a reason for your answer.

(Total for Question is 2 marks)

Q7.

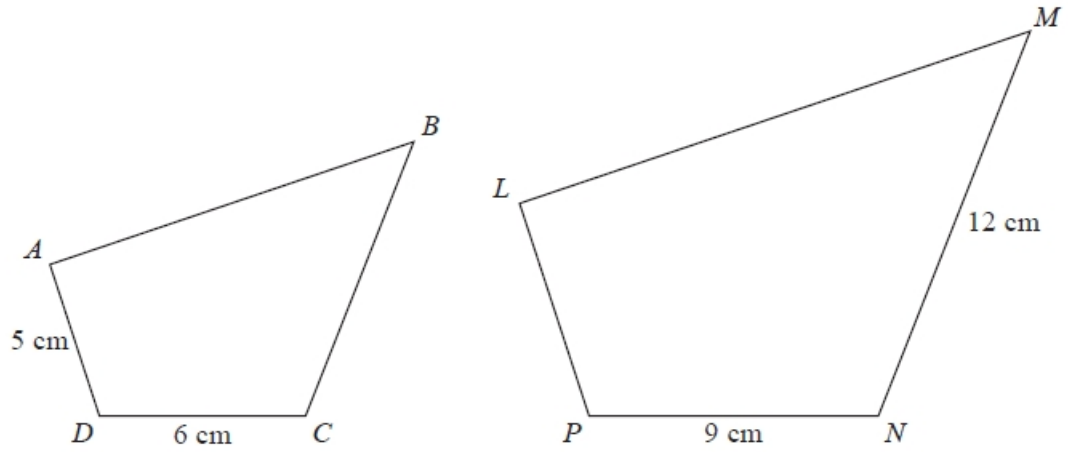


Diagram **NOT** accurately drawn

Quadrilaterals *ABCD* and *LMNP* are mathematically similar.

Angle *A* = angle *L*
Angle *B* = angle *M*
Angle *C* = angle *N*
Angle *D* = angle *P*

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

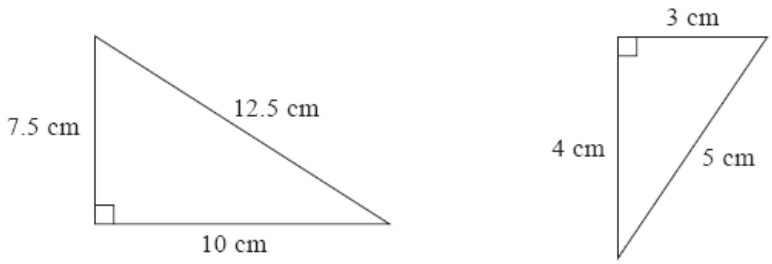
.....cm
(2)

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

.....cm
(2)

(Total for Question is 4 marks)

Q8.



Show that these two triangles are mathematically similar.

(Total for question = 2 marks)

Q9.

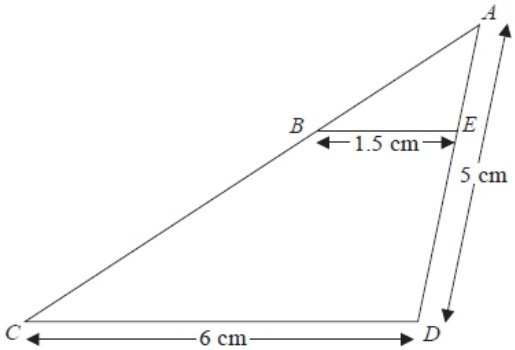


Diagram **NOT** accurately drawn

ABC and *AED* are straight lines.
BE and *CD* are parallel.
BE = 1.5 cm.
CD = 6 cm.
AD = 5 cm.

Calculate the length of *ED*.

..... cm

(Total for question = 3 marks)

Q10.

ABC is a triangle.

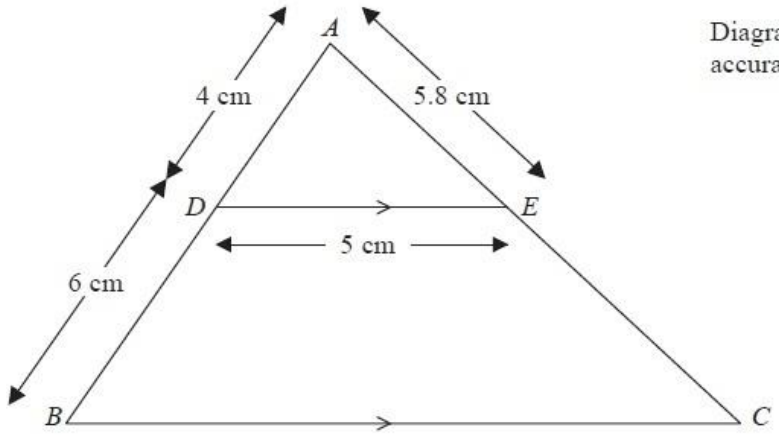


Diagram **NOT** accurately drawn

D is a point on *AB* and *E* is a point on *AC*.

DE is parallel to *BC*.

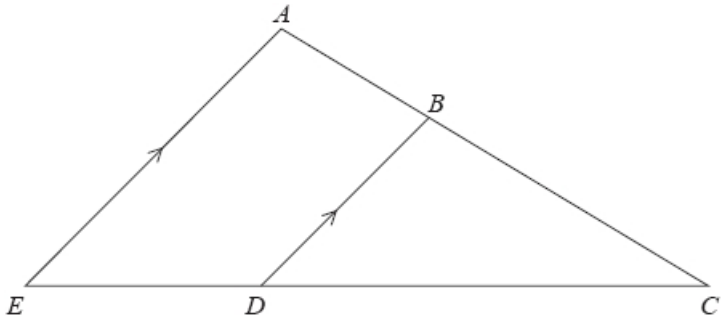
AD = 4 cm, *DB* = 6 cm, *DE* = 5 cm, *AE* = 5.8 cm.

Calculate the perimeter of the trapezium *DBCE*.

..... cm

(Total for Question is 4 marks)

Q11.



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)

Q12.

* *ABCD* and *PQRS* are two rectangles.

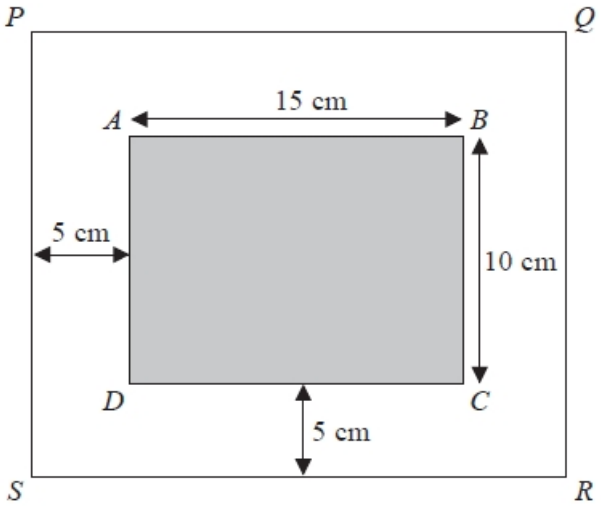


Diagram **NOT** accurately drawn

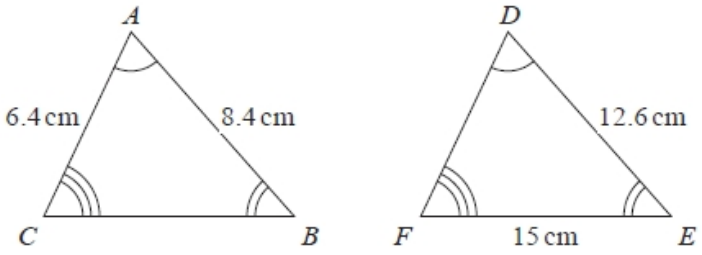
Rectangle *ABCD* is 15 cm by 10 cm.
There is a space 5 cm wide between rectangle *ABCD* and rectangle *PQRS*.

Are rectangle *ABCD* and rectangle *PQRS* mathematically similar?
You must show how you got your answer.

(Total for question = 3 marks)

Q13.

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



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

.....cm

(2)

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

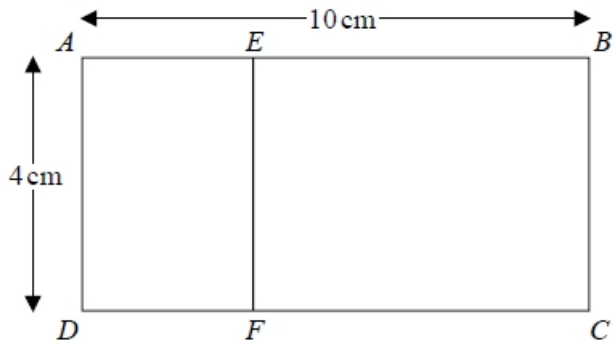
.....cm

(2)

(Total for question = 4 marks)

Q14.

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



AB = 10 cm.
AD = 4 cm.

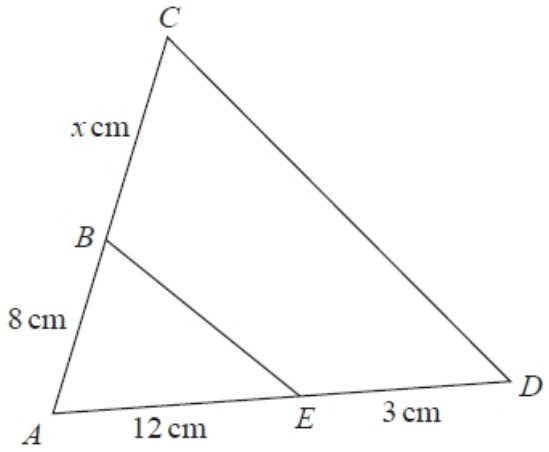
Work out the area of rectangle *DAEF*.

..... cm^2

(Total for question = 3 marks)

Q15.

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)