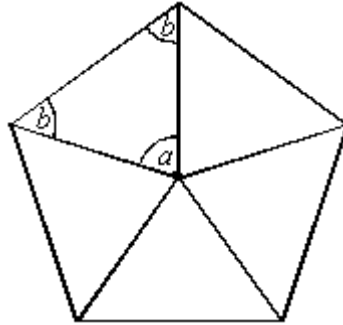


Q1. Turning triangles – task 1

- (a) This regular pentagon is made from 5 isosceles triangles that fit together around a point.

The triangles fit with no gaps and no overlaps.

Work out the angles in one of the triangles.



- (b) A regular decagon can be made from 10 isosceles triangles that fit together around a point with no gaps and no overlaps.

Work out the angles in one of these triangles.

- (c) All regular polygons can be made from isosceles triangles that fit together around a point with no gaps and no overlaps.

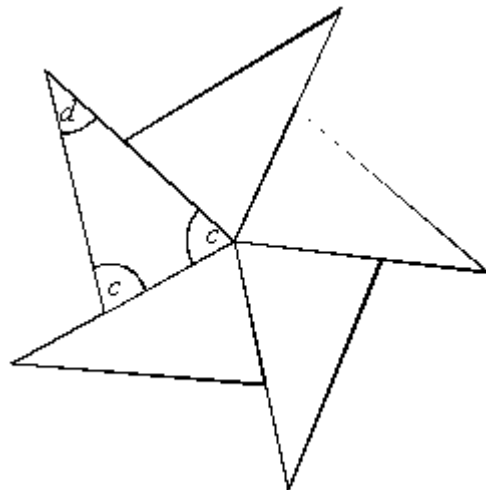
Only 12 of these regular polygons have isosceles triangles in which all the angles are whole numbers, and all the angles are whole numbers than or equal to 10° .

How many sides do these polygons have, and how can you be certain that there are no more than 12 of these polygons?

Turning triangles – task 2

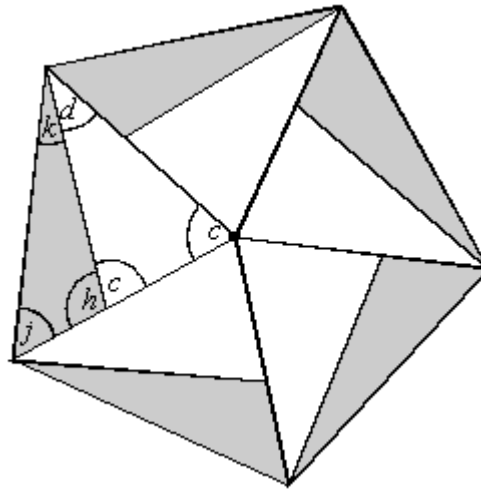
- (a) Isosceles triangles can fit together around a point in a different way to make 'windmill' patterns. The triangles fit with no gaps and no overlap.

Work out the angles in the triangle.



- (b) This windmill pattern has been made into a regular pentagon by drawing five extra triangles.

Work out the angles in each triangle.



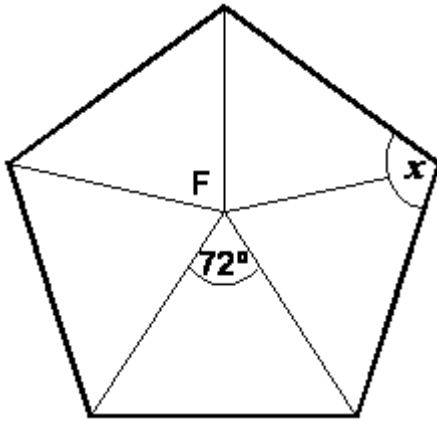
- (c) Other windmill patterns can be made into regular polygons in the same way by drawing extra triangles, with angles h , j and k .

Can you predict what angles h , j and k will be when you know angles c and d ?

Without working it out for every windmill pattern, how can you be certain your prediction will always work?

##

F is the centre of a **regular** pentagon.



Work out the value of **angle x** without using an angle measurer.

You **MUST** explain how you worked out your answer.

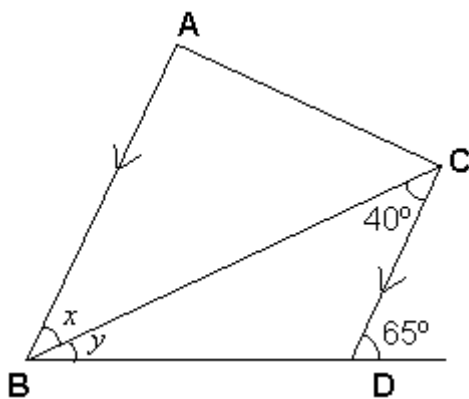


$x =$ °

2 marks

##

In this diagram **AB** is parallel to **CD**.



The diagram is not to scale

Work out the value of angle x .

Do not use an angle measurer.



1 mark

Calculate the value of angle y .

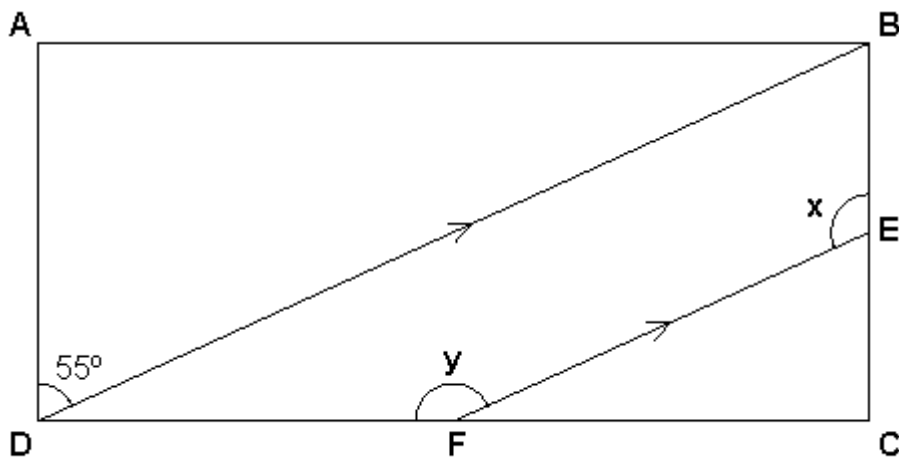
Do not use an angle measurer.



1 mark

Q4. The shape **ABCD** is a rectangle.

BD is parallel to **EF**.



Not to scale

Calculate the sizes of the angles x and y .

Do not use an angle measurer (protractor).

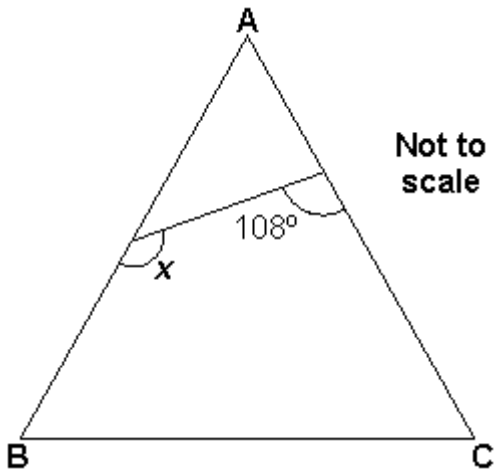


$x = \boxed{}^{\circ}$

$y = \boxed{}^{\circ}$

2 marks

Q5. Triangle **ABC** is **equilateral**.



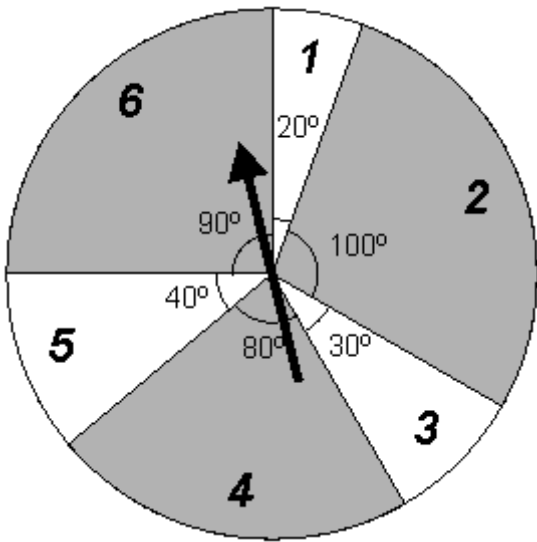
Calculate the size of **angle x**.

Do not use an angle measurer (protractor).

$x = \boxed{}$

1 mark

Q6. Rajiv makes this circular spinner.

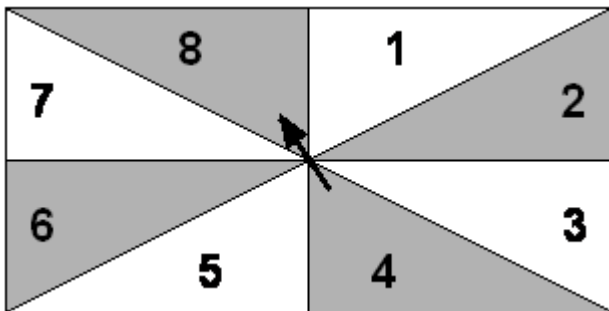


Calculate the probability of **scoring 5** on Rajiv's spinner.

Give your answer as a fraction.

1 mark

Vicky makes this **rectangular** spinner.



All the sections have **equal areas**.

She says,

'All the numbers on my spinner have the same probability of coming up'.

Explain why Vicky is **not** correct.



.....

.....

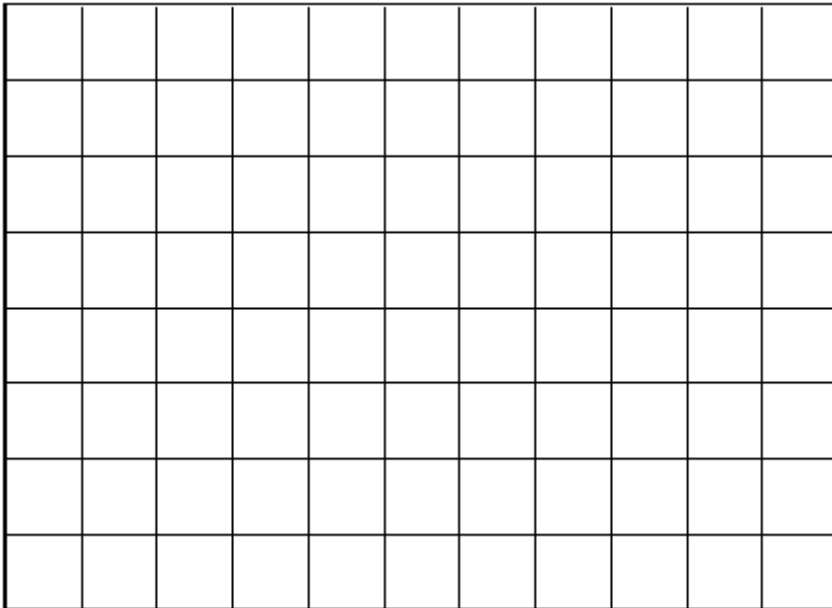
.....

1 mark

Q7. This is a centimetre grid.

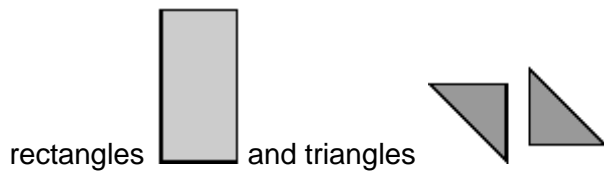
On the grid draw a **triangle** which has an **area of 7.5cm^2** and which has an **obtuse angle**.

Use a ruler.

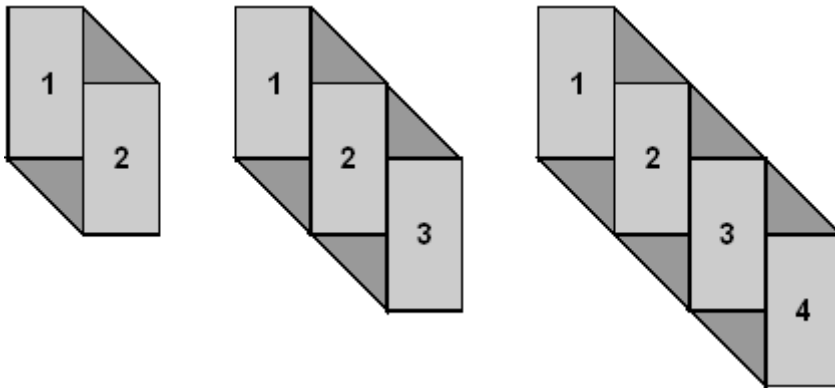


2 marks

Q8. Here is the start of a sequence of shapes using



Each rectangle has been numbered.



The pattern continues to grow in this way.

How many triangles will there be in the shape that has **50 rectangles** in it?




1 mark

T stands for the number of triangles in each shape.

R stands for the number of rectangles in each shape.

What is the rule connecting **T and R**?

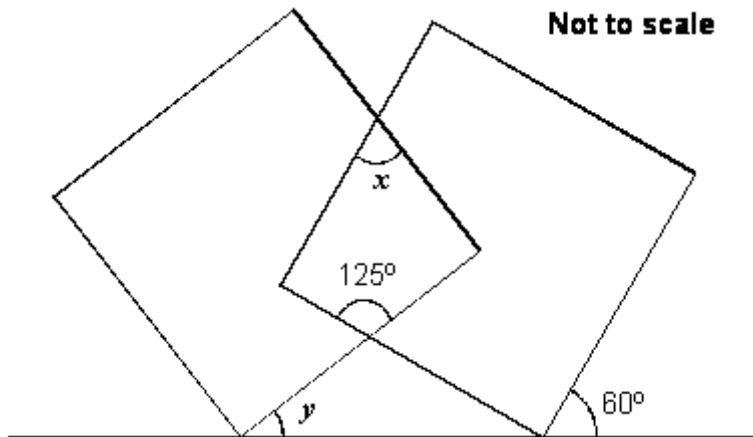


.....

.....

1 mark

Q9. The diagram shows two overlapping squares and a straight line.



Calculate the value of **angle x** and the value of **angle y**.

Do **not** use a protractor (angle measurer).

$x =$

$y =$

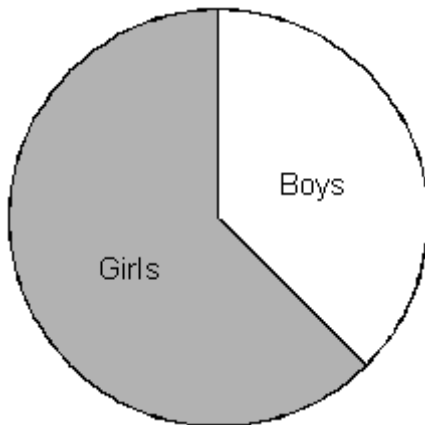
1 mark

1 mark

Q10. Sarah makes a pie chart to show the proportion of boys and girls in her class.

	Number in class	Size of angle on pie chart
Boys	14	144°

Girls	21	216°
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The next day another **boy** joins Sarah's class.

She makes a new pie chart.

Calculate the angle for **boys** on the new pie chart.

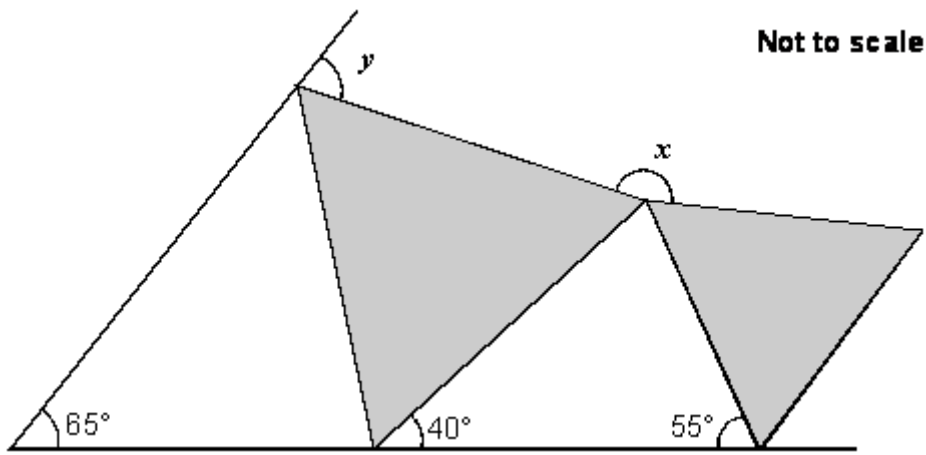


Show
your **working**.
You may get
a mark

○

2 marks

Q11. The diagram shows two shaded **equilateral triangles**.



Calculate the size of the **angle x°** and **angle y** .

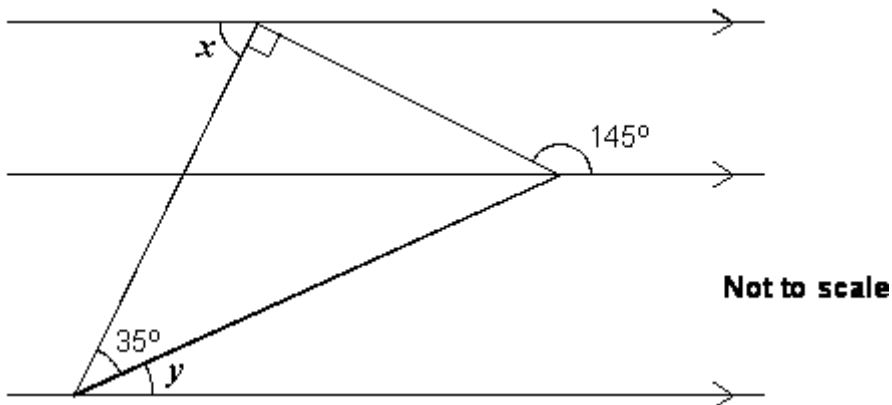
Do **not** use a protractor (angle measurer).



$x =$ $y =$

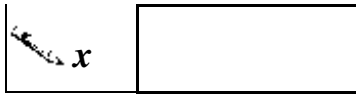
2 marks

Q12. The diagram shows a right-angled triangle and three parallel lines.

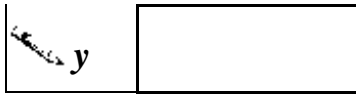


Calculate the size of angle x and angle y

Do **not** use a protractor (angle measurer).



1 mark

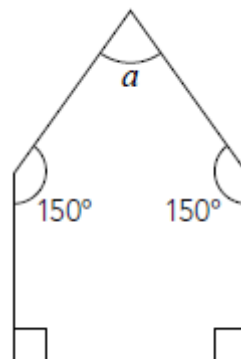


1 mark

Q13.

The diagram shows a pentagon.

Not drawn accurately



Each side of the pentagon is the **same length**.

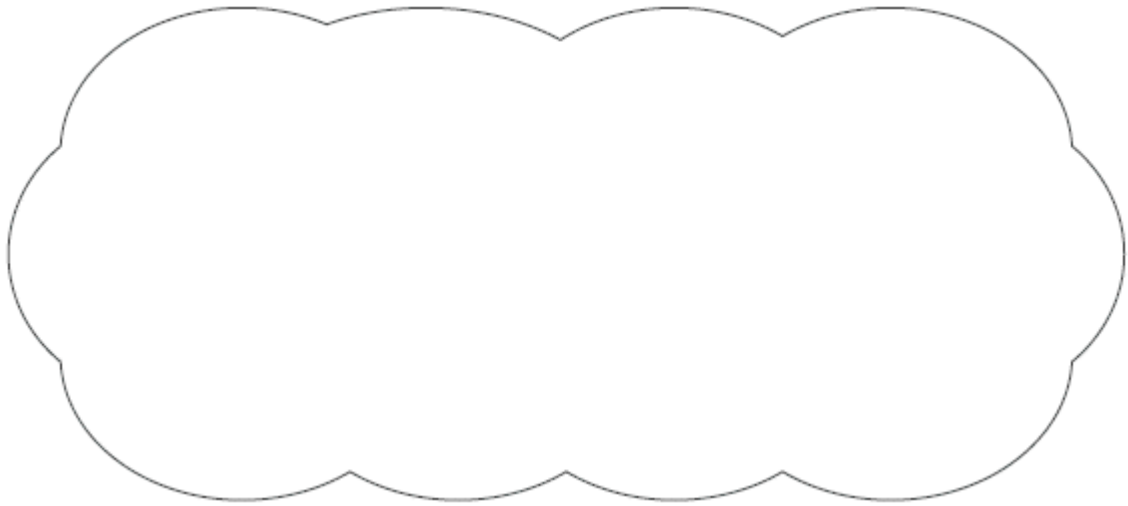
Is the shape a **regular** pentagon?

Circle Yes or No.

 Yes / No

Explain your answer.





1 mark

Work out the size of angle a

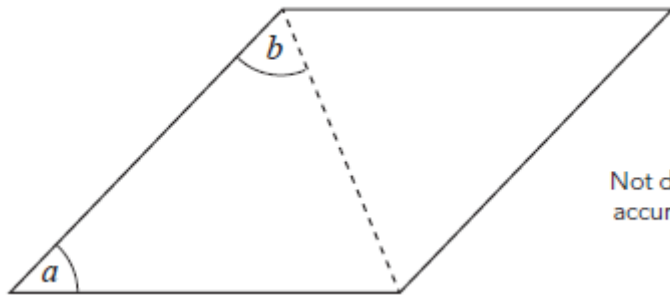


Show your working

$a =$

2 marks

Q14. The dotted line is a diagonal of this **rhombus**.



Not drawn accurately

If angle $a = 80^\circ$, what is angle b ?

Show
your
method



If angle $b = 80^\circ$, what is angle a ?



3 marks