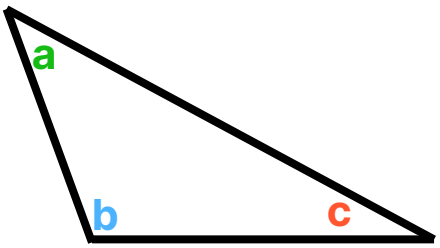
Geometry - Class 9

Key Rules:

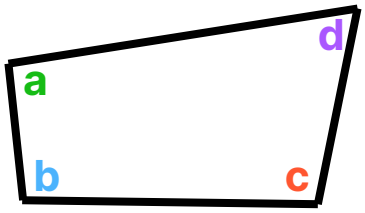
- Angles in a triangle add up to 180 degrees

$$a + b + c = 180$$



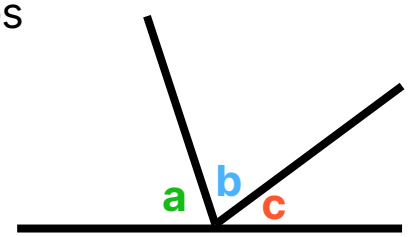
- Angles in a quadrilateral add up to 360 degrees

$$a + b + c + d = 360$$



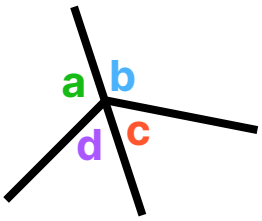
- Angles on a straight line add up to 180 degrees

$$a + b + c = 180$$

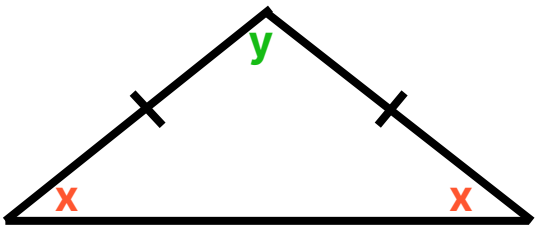


- Angles around a point add up to 360 degrees

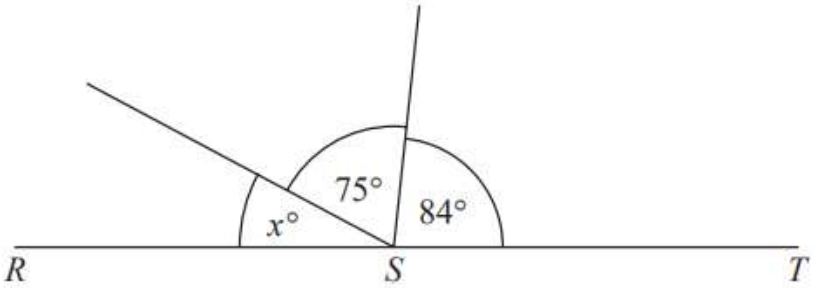
$$a + b + c + d = 360$$



- Two sides and two angles of an isosceles triangle are the same



Questions:

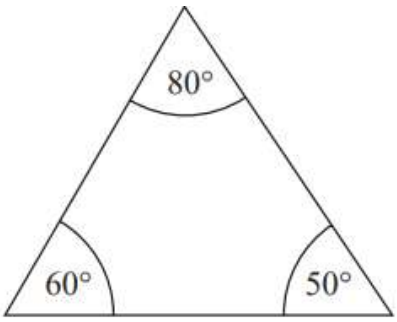


RST is a straight line.

Work out the value of x.

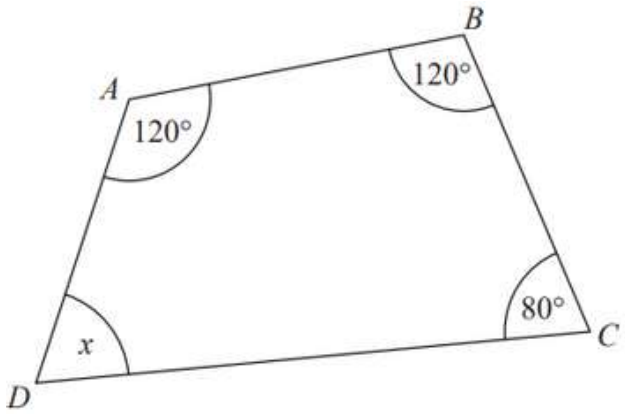
Give a reason for your answer.

The diagram below shows a triangle.



Explain why the diagram is wrong.

ABCD is a quadrilateral.



Work out the size of the angle x.

Give a reason for your answer.

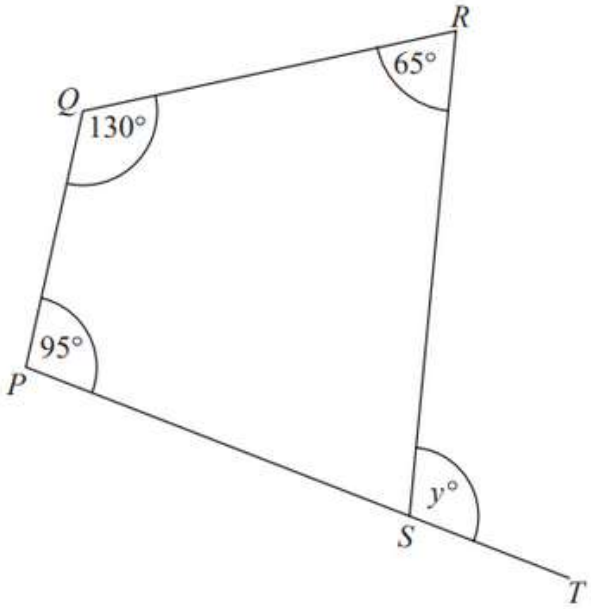
Jemma measures all the angles around a point.

Her results are 23, 145, 23 and 69 degrees.

Explain why these results cannot be true.

PQRS is a quadrilateral.

PST is a straight line.



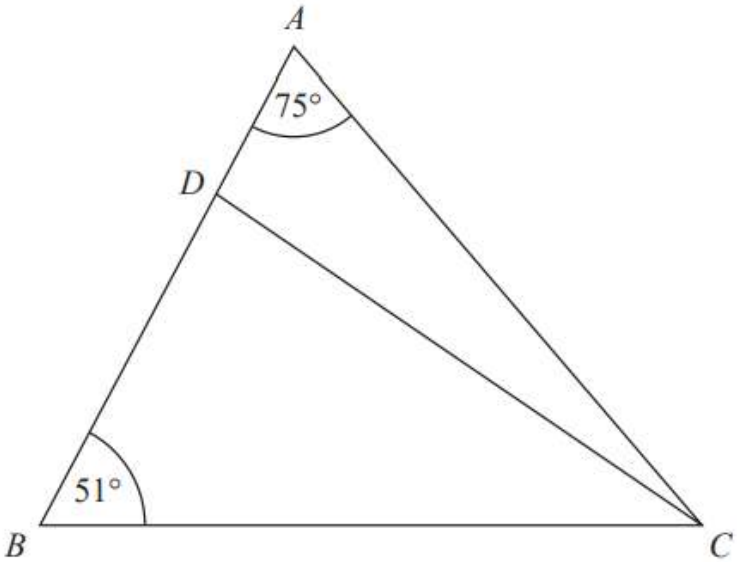
Find the value of y

The diagram shows triangle ABC.

ABD is a straight line.

the size of angle DCB : the size of angle ACD = 2 : 1

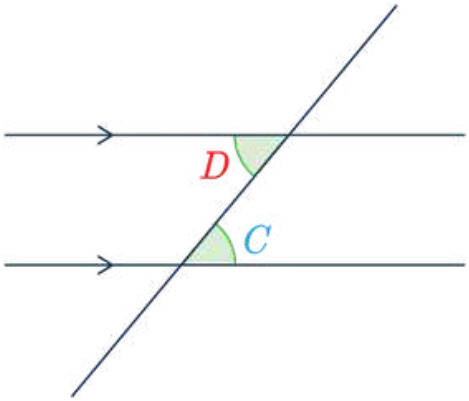
Work out the size of angle BDC.



Geometry - Class 9

Parallel Lines and Angles

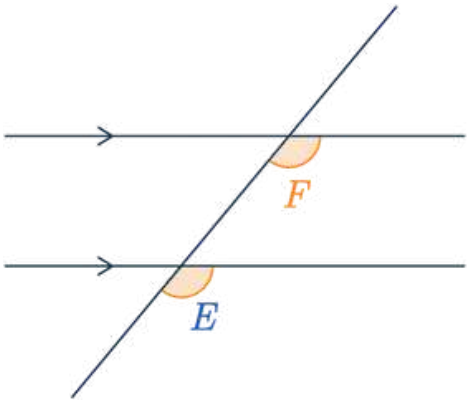
Alternate Angles



D = C

They are found in a 'Z' shape and are sometimes called Z angles.

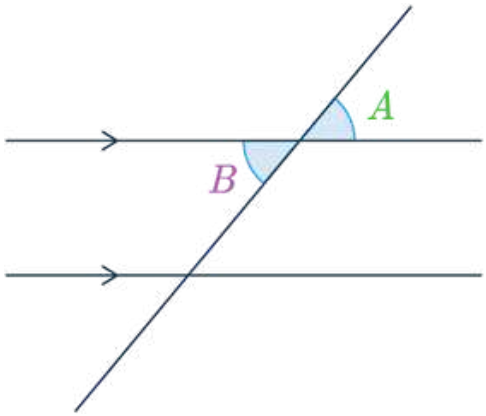
Corresponding Angles



F = E

They are found in a 'F' shape and are sometimes called F angles.

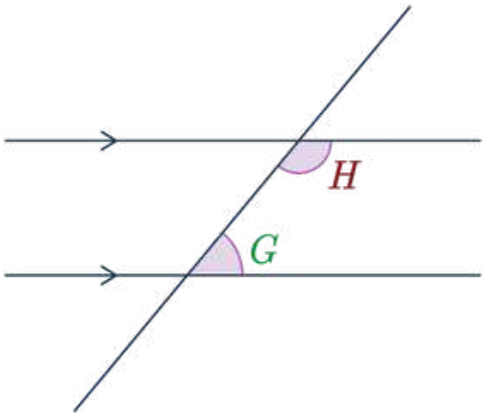
Vertically Aligned Angles



B = A

They are found vertically opposite each other.

Interior/Allied Angles



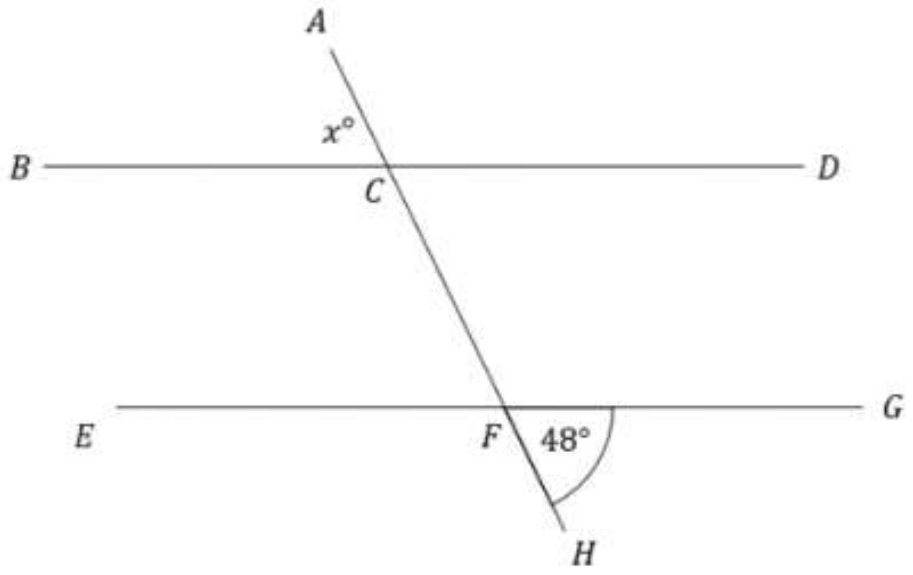
H + G = 180

They are found in a 'C' shape and can be referred to as either allied or interior angles

Questions:

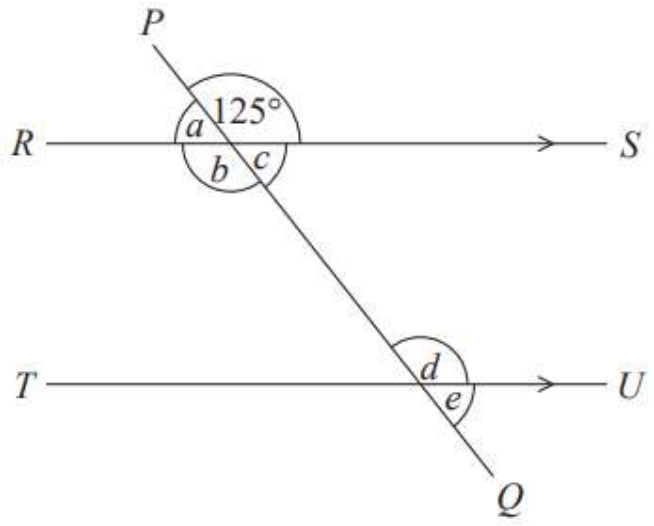
BD and EG are parallel lines. Find the angle marked x in the picture below.

Give a reason for each stage of your working.



RS and TU are parallel lines.

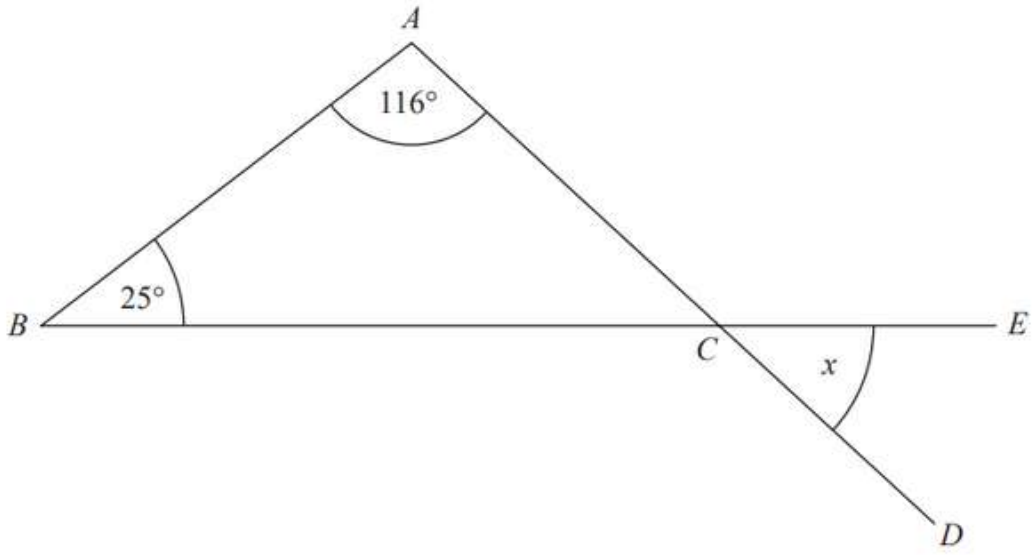
PQ is a straight line.



Write down the letter of one other angle of size 125 degrees

Explain why a + b + c = 235 degrees

The diagram shows a triangle ABC.

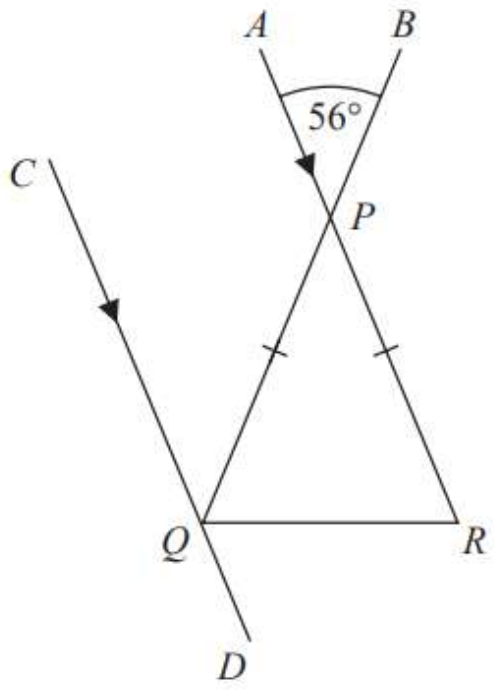


ACD and BCE are straight lines.

Work out the size of the angle marked x.

Give a reason for each stage of your working.

In the diagram, PQR is an isosceles triangle with PQ = PR

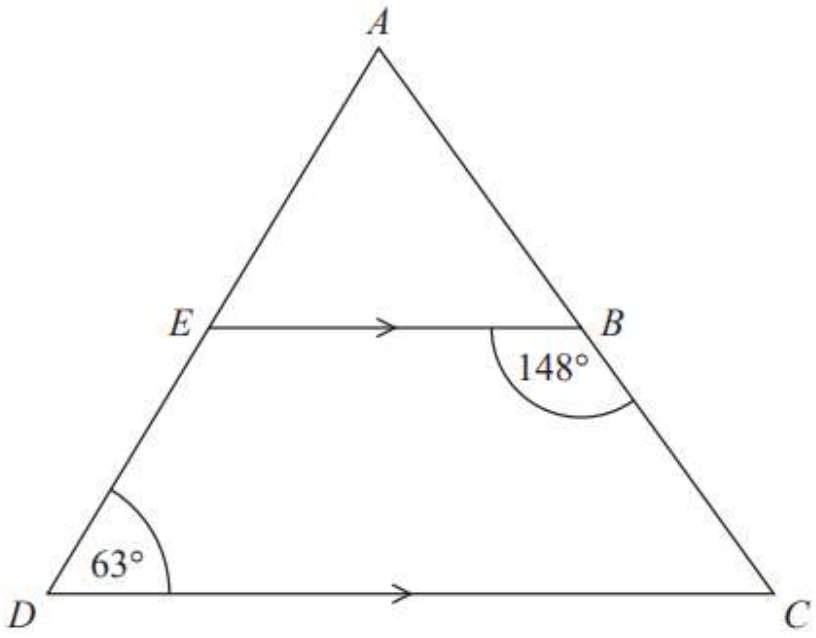


APR and CQD are parallel lines.
BPQ is a straight line.

Work out the size of angle CQR.

Give a reason for each stage of your working.

ADC is a triangle.



AED and ABC are straight lines.
EB is parallel to DC.

Work out the size of angle EAB.

You must give a reason for each stage of your working.

Interior Angles

There is a formula for the sum of the interior angles inside a shape:

$$(n - 2) \times 180$$

n ---> number of sides

Triangle ---> (3-2) x 180 = 180 degrees

Quadrilateral ---> (4-2) x 180 = 360 degrees

Note: If the shape is **regular** this means all the angles are the same. You can therefore divide the total interior angles by the amount of sides to find each individual interior angle:

$$\frac{(n - 2) \times 180}{n}$$

Example:

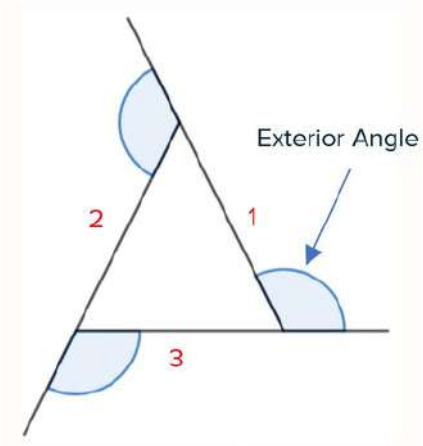
Work out the size of each interior angle inside a regular pentagon.

Pentagon ---> 5 sided shape
Sum of interor angles = (5-2) x 180 = 540
Each interior angle = 540÷5 = 108 degrees

Exterior Angles

There is a formula to find the exterior angle of a regular shape:

360÷n



n ---> number of sides

Triangle ---> 360÷3 = 120 degrees

Note: This formulae only works for regular shapes.

Example:

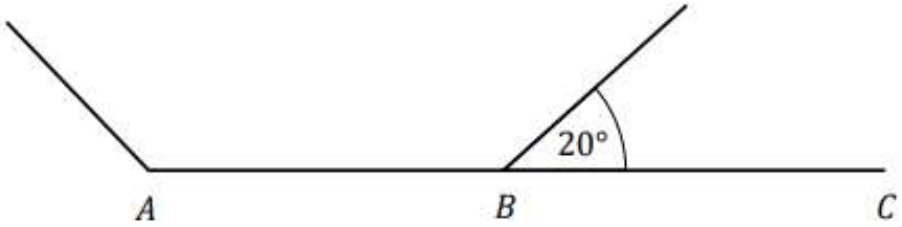
Each exterior angle of a regular polygon is 15 degrees.

Work out the number of sides of the polygon.

360 ÷ n = 15

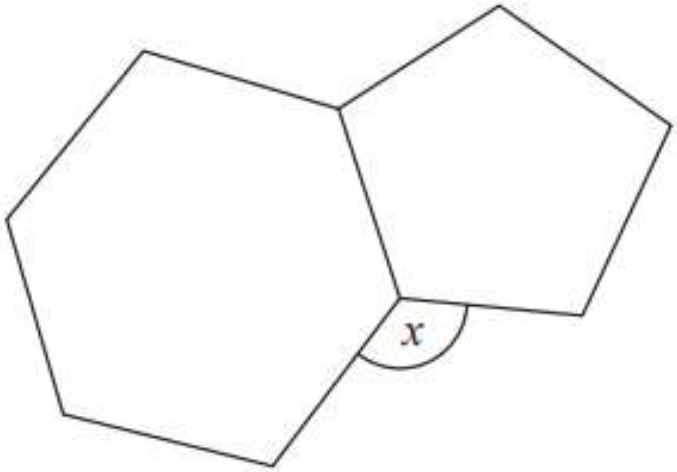
n = 360÷15 = 24 sides

The diagram below shows a regular polygon.



Find the number of sides of the polygon.

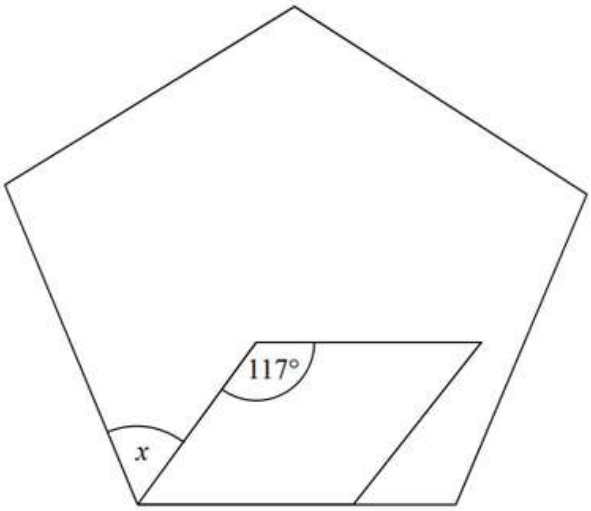
Here is a regular hexagon and a regular pentagon.



Work out the size of the angle marked x.

You must show all your working.

The diagram shows a regular pentagon and a parallelogram.



Work out the size of the angle marked x.

You must show all your working.