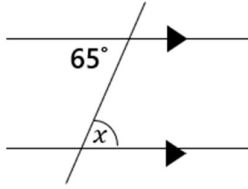


ANGLES IN PARALLEL LINES

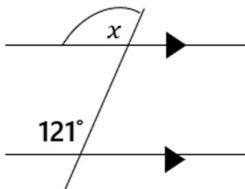
Task 1 – For each of the following, work out the size of the angle x . Give a reason for your answer.

1)



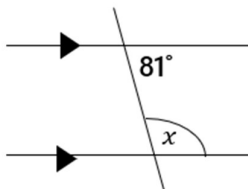
$x = 65^\circ$
Alternate angles are equal.

2)



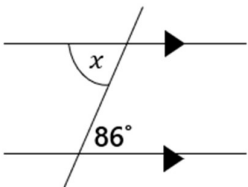
$x = 121^\circ$
Corresponding angles are equal.

3)



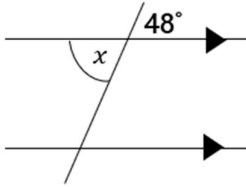
$x = 180 - 81 = 99^\circ$
Co-interior angles add to 180°

4)



$x = 86^\circ$
Alternate angles are equal.

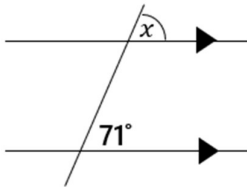
5)



$$x = 48^\circ$$

Vertically opposite angles are equal.

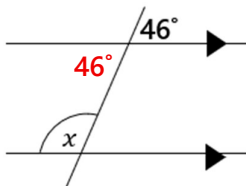
6)



$$x = 71^\circ$$

Corresponding angles are equal.

7)

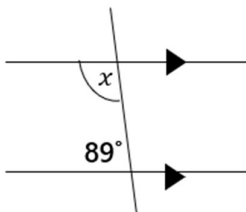


$$x = 180 - 46 = 134^\circ$$

Vertically opposite angles are equal.

Co-interior angles add to 180°

8)



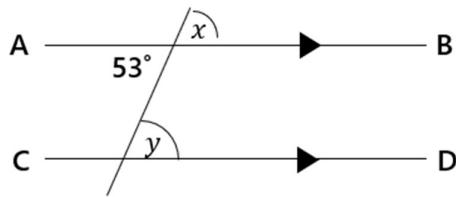
$$x = 180 - 89 = 91^\circ$$

Co-interior angles add to 180°

Task 2 – Note that for each of the following questions, the diagrams are not drawn accurately.

9) AB and CD are parallel lines.

Work out the size of the angles x and y .



Give reasons for your answers.

$$x = 53^\circ$$

Vertically opposite angles are equal.

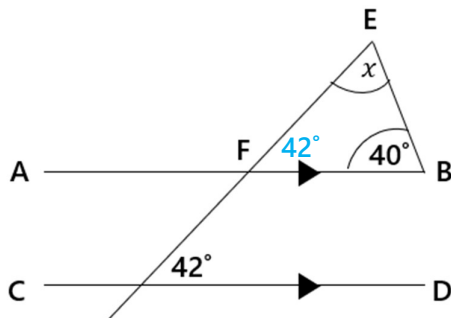
$$y = 53^\circ$$

Corresponding angles are equal.

10) AB and CD are parallel lines.

FEB is a triangle.

Work out the size of the angle x .



Give a reason for each stage of your working.

$$\text{Angle } EFB = 42^\circ$$

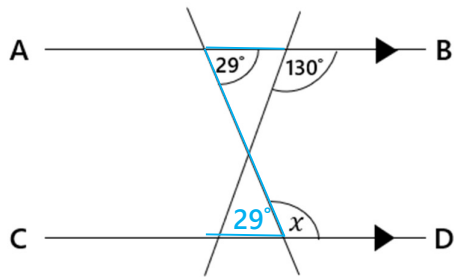
Corresponding angles are equal.

$$x = 180 - 42 - 40 = 98^\circ$$

Angles in a triangle add to 180° .

11) AB and CD are parallel lines.

Work out the size of the angle marked x .



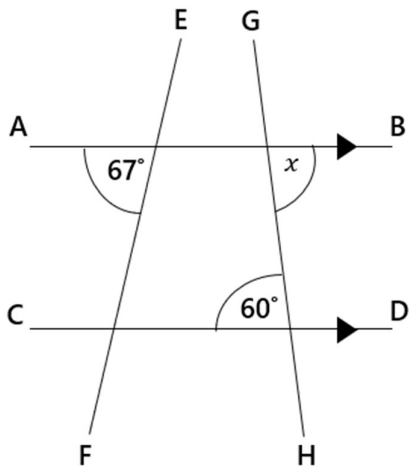
Give two reasons for your answer.

Alternate angles are equal.

$$x = 180 - 29 = 151^\circ$$

Angles on a straight line add to 180° .

12) AB and CD are parallel lines. Work out the size of the missing angle x .

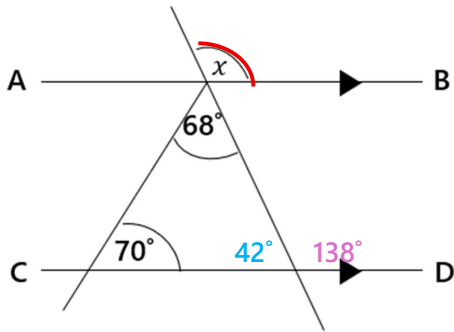


Give a reason for your answer.

$$x = 60^\circ$$

Alternate angles are equal.

- 13) AB and CD are parallel lines.
Work out the size of the angle marked x .



Give a reason for each stage in your working.

$$180 - 68 - 70 = 42^\circ$$

Angles in a triangle add to 180°

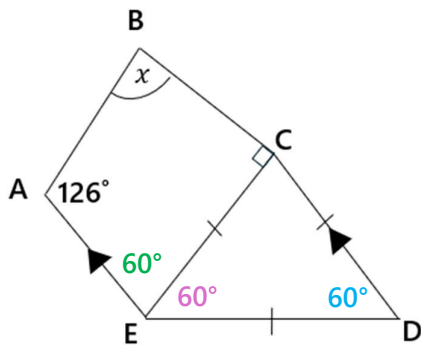
$$180 - 42 = 138^\circ$$

Angles on a straight line add to 180°

$$x = 138^\circ$$

Corresponding angles are equal.

- 14) ABCE is a quadrilateral and CED is a triangle. Work out the size of the missing angle x . You must show all your working.



Triangle CED is equilateral

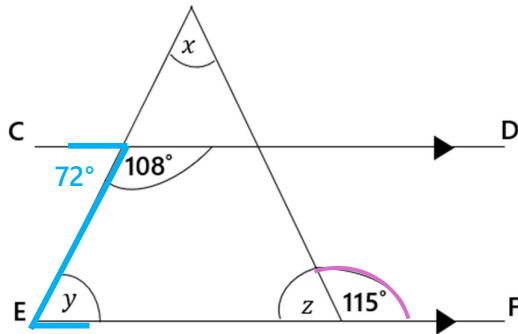
Angle CED = 60°

Angle CDE and AED are co-interior

Angle AEC = $180 - 60 - 60 = 60^\circ$

$$x = 360 - 126 - 60 - 90 = 84^\circ$$

- 15) The lines CD and EF are parallel. Work out the size of the missing angles x , y and z . You must show all your working.



$$180 - 108 = 72^\circ$$

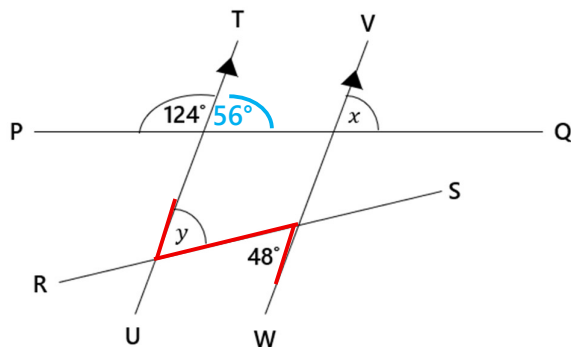
$$y = 72^\circ$$

$$z = 180 - 115 = 65^\circ$$

$$x = 180 - 72 - 65 = 43^\circ$$

$$x = 43^\circ \quad y = 72^\circ \quad z = 65^\circ$$

- 16) The lines TU and VW are parallel. Work out the size of the missing angles x and y . Give reasons for your answers.



$$180 - 124 = 56^\circ$$

$$x = 56^\circ$$

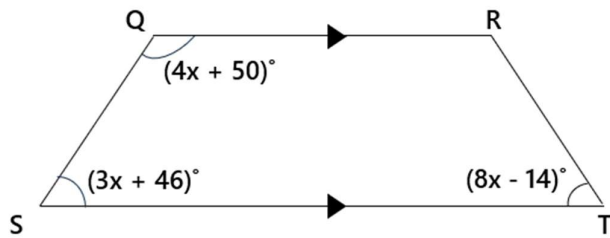
Angles on a straight line add to 180° .

Corresponding angles are equal.

$$y = 48^\circ$$

Alternate angles are equal.

17) QRST is a trapezium. Work out the size of the smallest angle in the trapezium.



Co-interior angles add to 180°:

$$4x + 50 + 3x + 46 = 180$$

$$7x + 96 = 180$$

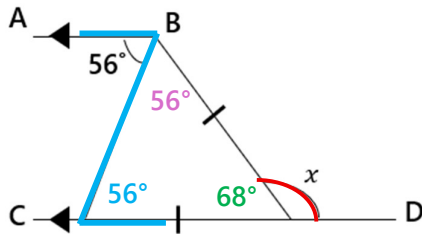
$$7x = 84$$

$$x = 12$$

Smallest angle:

$$3(12) + 46 = 82^\circ$$

18) AB and CD are parallel lines. Work out the size of the missing angle x .



Give a reason for each stage in your working.

Angle BCD = 56°

Alternate angles are equal

Angles at the base of an isosceles triangle are equal

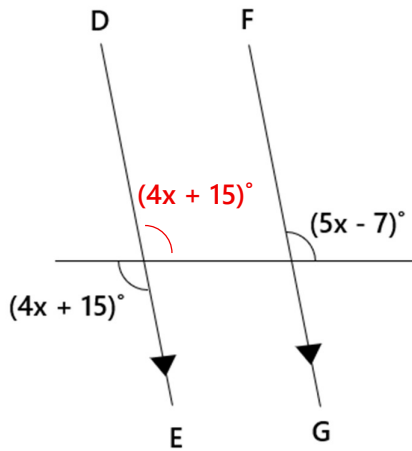
Angles in a triangle add to 180°

$$180 - 56 - 56 = 68^\circ$$

Angles on a straight line add to 180°

$$x = 180 - 68 = 112^\circ$$

19) DE and FG are parallel lines. Solve for x .



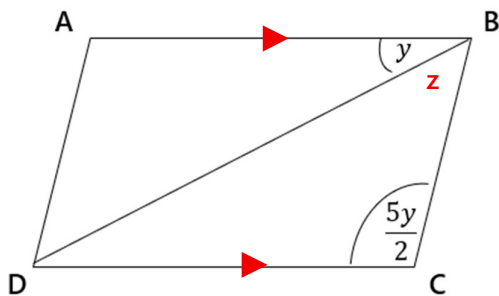
Corresponding angles are equal

$$4x + 15 = 5x - 7$$

$$x = 22^\circ$$

Challenge

20) ABCD is a parallelogram.



Find an expression, in terms of y , for the angle DBC.

Angle ABC and angle DCB are co-interior

Let angle DBC = z

$$y + z + \frac{5y}{2} = 180$$

Make z the subject:

$$\frac{7y}{2} + z = 180$$

$$z = 180 - \frac{7y}{2}$$

Angle DBC:

$$180 - \frac{7y}{2}$$