

## WALT solve angles involving parallel lines

### Success Criteria

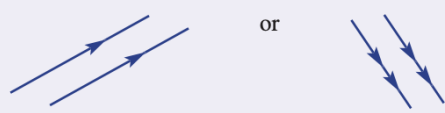
- I can identify parallel lines and corresponding and alternate angles.
- I can use the properties of corresponding and alternate angles to find missing angles.
- I can solve problems involving angles formed by parallel lines.

Copy the diagrams

■ Lines are **parallel** if they do not intersect.


- Parallel lines are marked with the same number of arrows.

or




■ If two parallel lines are cut by a transversal:

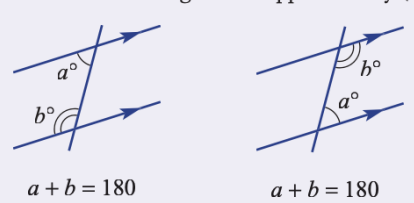
- the corresponding angles are equal (4 pairs)



- the alternate angles are equal (2 pairs)



- the co-interior angles are supplementary (sum to  $180^\circ$ ) (2 pairs).



$a + b = 180$                        $a + b = 180$

**Parallel lines**  
Lines in the same plane that are the same distance apart and never intersect


[View the video on angles involving parallel lines](#)

Use the information from the diagram and answer your questions

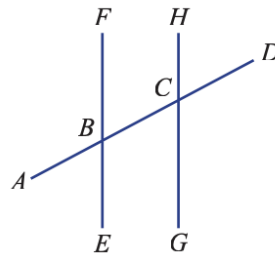
**1** Two parallel lines are cut by a transversal. Write the missing word.

- a** Corresponding angles are \_\_\_\_\_.
- b** Co-interior angles are \_\_\_\_\_.
- c** Alternate angles are \_\_\_\_\_.

Choose from: **equal** or **supplementary**.



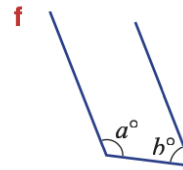
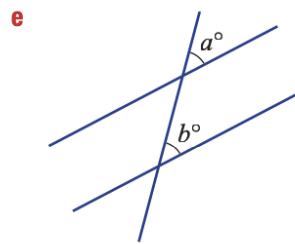
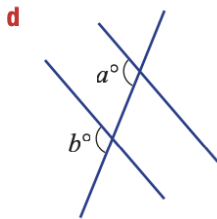
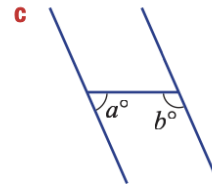
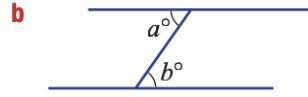
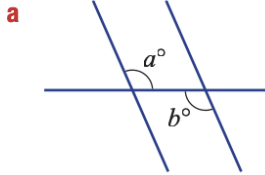
- 2** Name the angle that is:
- a** corresponding to  $\angle ABF$
  - b** corresponding to  $\angle BCG$
  - c** alternate to  $\angle FBC$
  - d** alternate to  $\angle CBE$
  - e** co-interior to  $\angle HCB$
  - f** co-interior to  $\angle EBC$
  - g** vertically opposite to  $\angle ABE$
  - h** vertically opposite to  $\angle HCB$



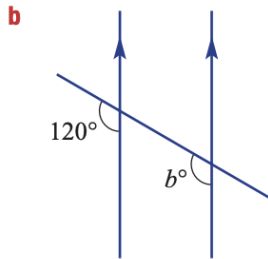
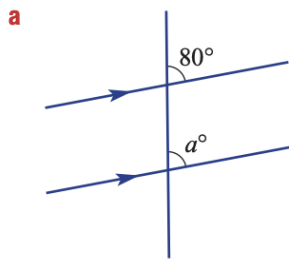
Name angles like this  $\angle ABC$  or  $\angle DEF$ .



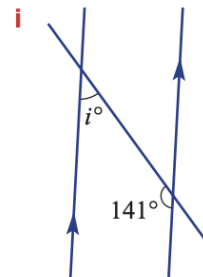
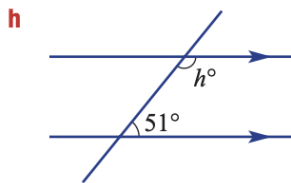
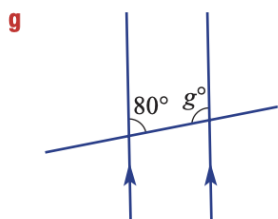
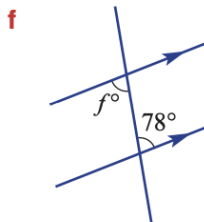
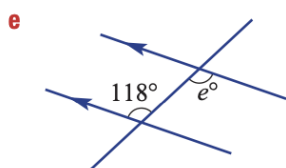
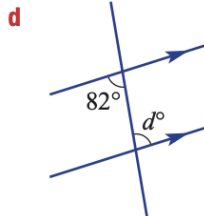
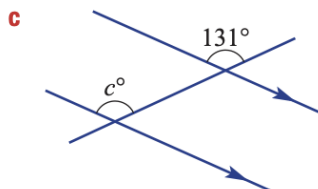
- 3** State whether the following marked angles are corresponding, alternate or co-interior.



- 4 Find the value of the pronumerals in these diagrams.  
Give a reason for each answer.

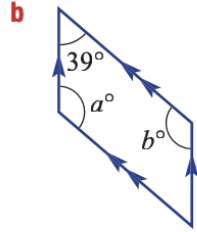
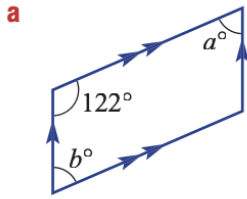


Corresponding angles are equal in parallel lines.  
Alternate angles are equal in parallel lines.  
Cointerior angles in parallel lines are supplementary (add to  $180^\circ$ ).

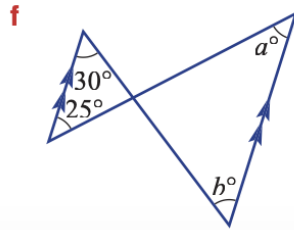
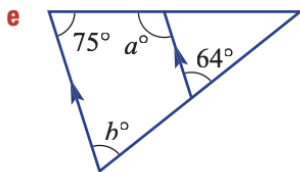
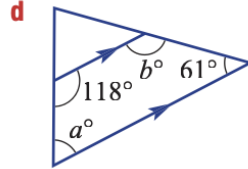
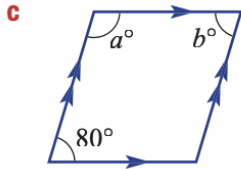
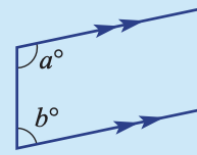


Extension

5 Find the value of the pronumerals in these diagrams, stating reasons.



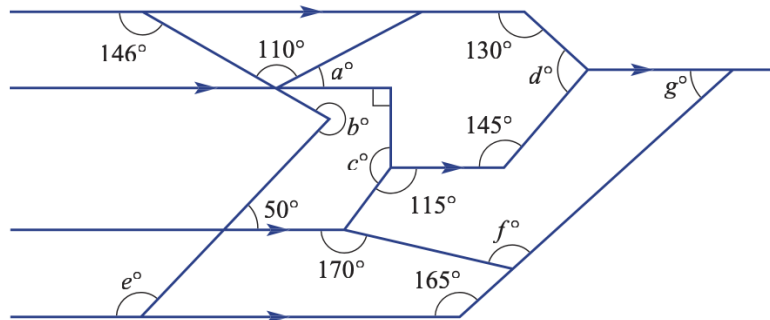
Co-interior angles add to  $180^\circ$ .



Where is this used in real life?

★ Pipe networks

10 A plan for a natural gas plant includes many intersecting pipe lines, some of which are parallel. Help the designers finish the plans by calculating the size of the angles marked  $a$ ,  $b$  etc.



Check your answers

- 1** **a** equal      **b** supplementary      **c** equal
- 2** **a**  $\angle BCH$       **b**  $\angle ABE$       **c**  $\angle GCB$       **d**  $\angle BCH$   
**e**  $\angle FBC$       **f**  $\angle GCB$       **g**  $\angle FBC$       **h**  $\angle DCG$
- 3** **a** alternate      **b** alternate  
**c** co-interior      **d** corresponding  
**e** corresponding      **f** co-interior
- 4** **a** 80 (corresponding)      **b** 120 (corresponding)  
**c** 131 (corresponding)      **d** 82 (alternate)  
**e** 118 (alternate)      **f** 78 (alternate)  
**g** 100 (co-interior)      **h** 129 (co-interior)  
**i** 39 (co-interior)
- 5** **a**  $a = 58, b = 58$  (both co-interior to  $122^\circ$ )  
**b**  $a = 141, b = 141$  (both co-interior to  $39^\circ$ )  
**c**  $a = 100$  (co-interior to  $80^\circ$ ),  $b = 80$  (co-interior to  $a^\circ$ )  
**d**  $a = 62$  (co-interior to  $118^\circ$ ),  
 $b = 119$  (co-interior to  $61^\circ$ )  
**e**  $a = 105$  (co-interior to  $75^\circ$ ),  
 $b = 64$  (corresponding to  $64^\circ$ )  
**f**  $a = 25$  (alternate to  $25^\circ$ ),  $b = 30$  (alternate to  $30^\circ$ )
- 10**  $a = 36, b = 276, c = 155, d = 85,$   
 $e = 130, f = 155, g = 15$