



THIRD SPACE  
LEARNING

# Diagnostic Questions

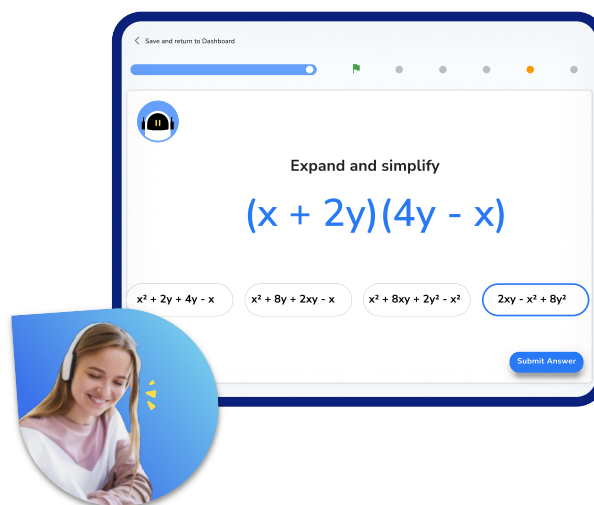
Angle Facts | Geometry &  
Measure

## This resource in a nutshell

Diagnostic questions are a quick and easy way of assessing your students' knowledge and understanding of a particular topic.

Students may be struggling with **angle facts** for a number of different reasons. Diagnostic questions can help to identify the particular misconception that the student has and help to determine the specific support they will need in order to improve.

They are low stakes and support students developing metacognition around how their learning is progressing and what they need to do to improve further.



At Third Space Learning, we use diagnostic questions before and after online tutoring sessions to identify gaps and track progress, an example of this is shown above.

## How to use the questions in this resource

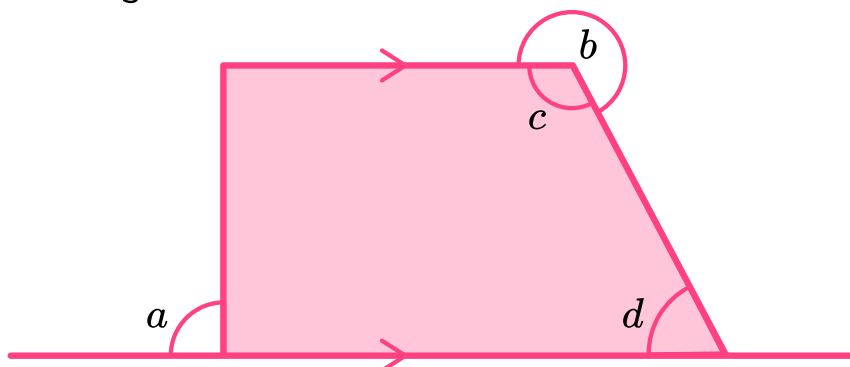
There are 20 multiple choice questions, each designed to assess each of the key skills required to master the given topic. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Incorrect angle facts**, **Properties of quadrilaterals**, and **Forming and solving equations**.

When answering these questions, students should be **encouraged to explain why they have chosen a particular answer**, and why the other three answers are incorrect. This can be done verbally in small groups, or written down on the worksheet or in their books.

This resource has been designed to be as **flexible** as possible with questions that can be easily chopped up and reordered, and come with a separate answer sheet that details all of the misconceptions highlighted in the answers.

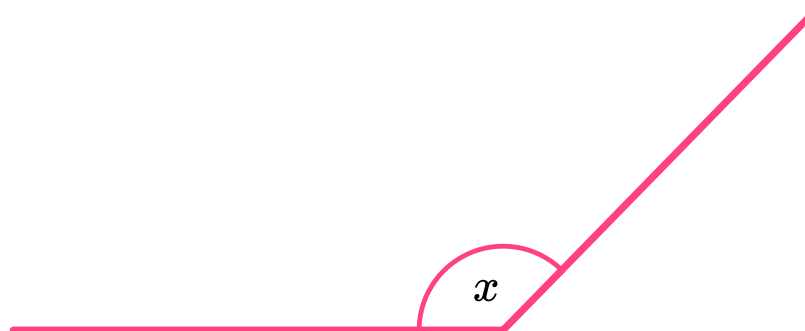
## Diagnostic Questions: Angle Facts

1. Identify the acute angle:



A) Angle $a$	B) Angle $b$
C) Angle $c$	D) Angle $d$

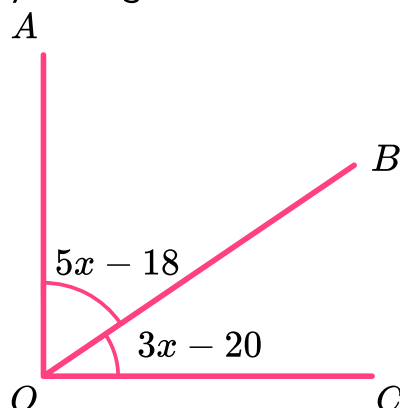
2. Select the inequality that defines an obtuse angle:



A) $0 < x < 180^\circ$	B) $90^\circ < x < 180^\circ$
C) $90^\circ \leq x \leq 180^\circ$	D) $90^\circ < x < 360^\circ$

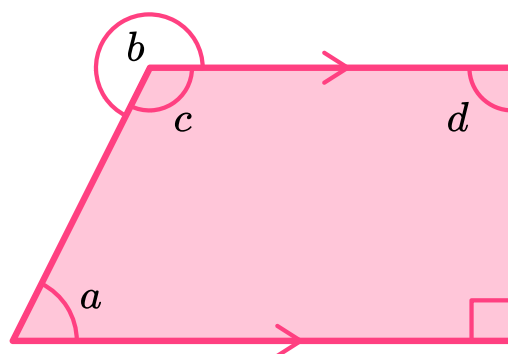
## Diagnostic Questions: Angle Facts

3. Angle  $AOB$  is complementary to angle  $BOC$ . Determine the size of angle  $BOC$ :



A) $62^\circ$	B) $16^\circ$
C) $28^\circ$	D) $45^\circ$

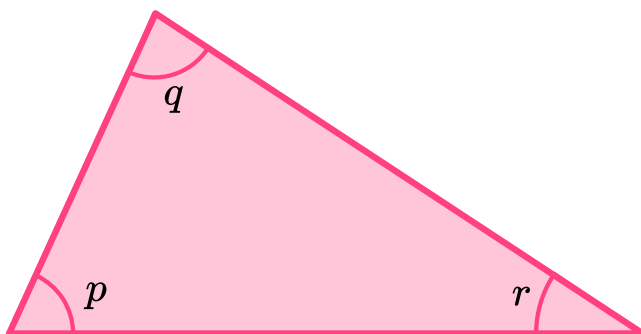
4. The shape pictured is a trapezium. Identify the reflex angle:



A) Angle $a$	B) Angle $b$
C) Angle $c$	D) Angle $d$

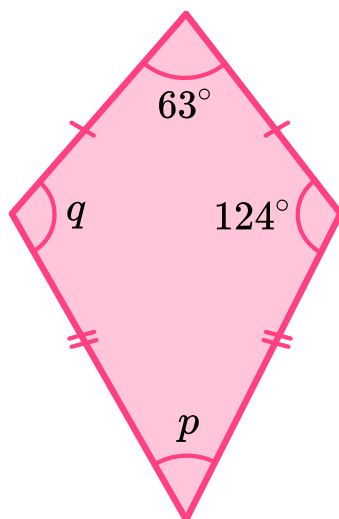
## Diagnostic Questions: Angle Facts

5. What is the sum of angles  $p$ ,  $q$  and  $r$ ?



A) $180^\circ$	B) $360^\circ$
C) $90^\circ$	D) $200^\circ$

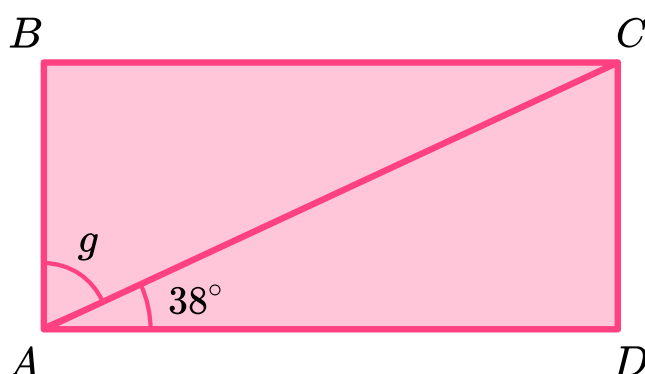
6. The shape pictured is a kite. Find the size of angle  $p$ :



A) $49^\circ$	B) $173^\circ$
C) $63^\circ$	D) $56^\circ$

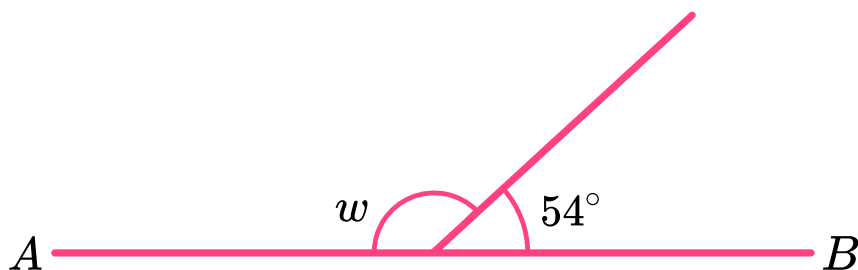
## Diagnostic Questions: Angle Facts

7. Given that  $ABCD$  forms a rectangle, find the size of angle  $g$ :



A) $38^\circ$	B) $62^\circ$
C) $52^\circ$	D) $142^\circ$

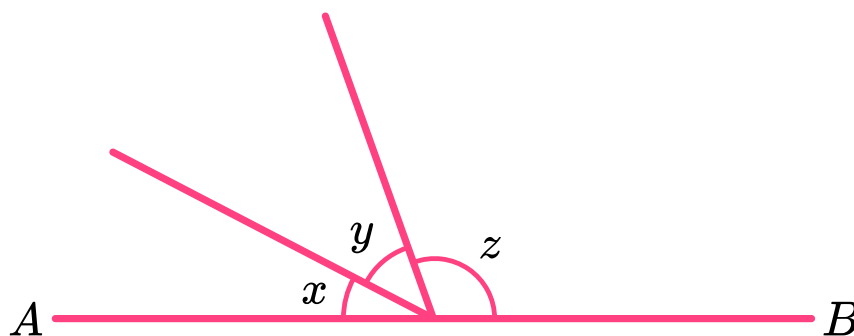
8. Given that  $AB$  is a straight line, find the size of angle  $w$ :



A) $136^\circ$	B) $36^\circ$
C) $108^\circ$	D) $126^\circ$

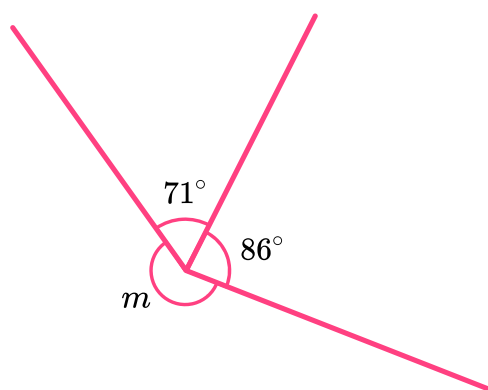
## Diagnostic Questions: Angle Facts

9.  $AB$  is a straight line. The sizes of angles  $x$ ,  $y$  and  $z$  are in the ratio 2:3:7.  
Find the size of angle  $y$ :



A) $60^\circ$	B) $15^\circ$
C) $45^\circ$	D) $36^\circ$

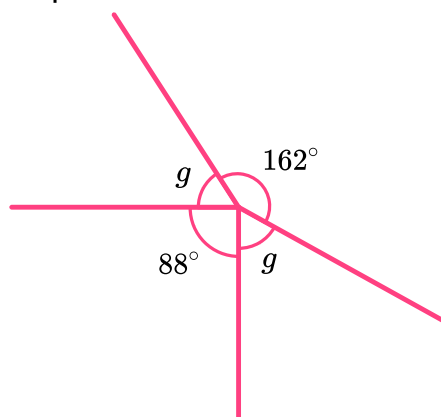
10. Three straight lines meet at a point as shown. Find the size of angle  $m$ :



A) $157^\circ$	B) $203^\circ$
C) $147^\circ$	D) $213^\circ$

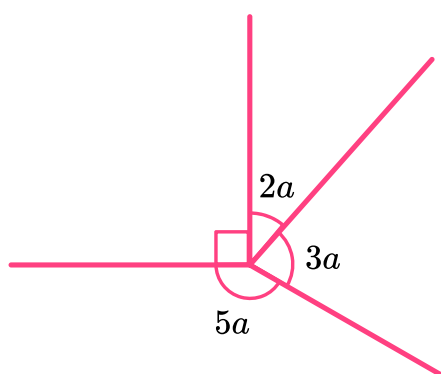
## Diagnostic Questions: Angle Facts

11. Four straight lines meet at a point. Find the size of angle  $g$ :



A) $55^\circ$	B) $110^\circ$
C) $18^\circ$	D) $74^\circ$

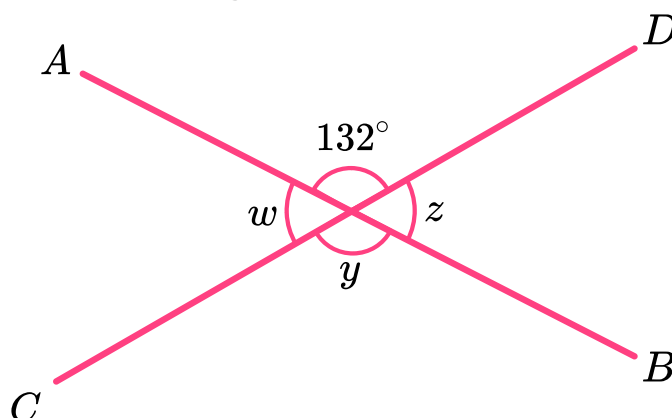
12. Four lines meet at a point as shown. Find the size of the smallest angle in the diagram:



A) $36^\circ$	B) $27^\circ$
C) $72^\circ$	D) $54^\circ$

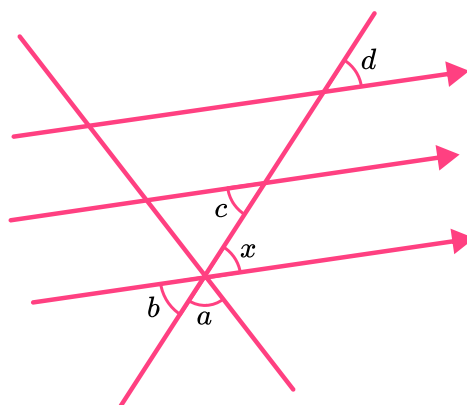
## Diagnostic Questions: Angle Facts

13. Given that  $AB$  and  $CD$  are straight lines, find the size of angle  $y$ :



A) $132^\circ$	B) $48^\circ$
C) $228^\circ$	D) $264^\circ$

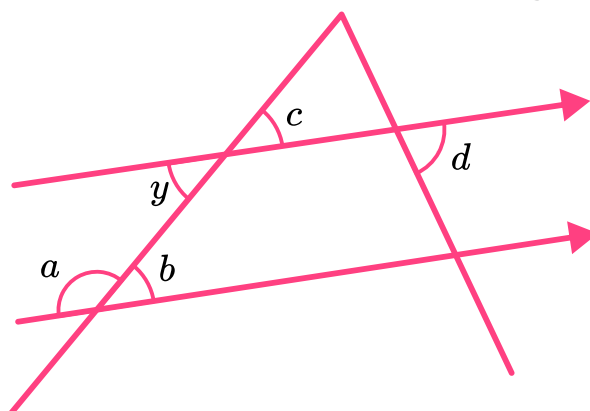
14. Angle  $x$  is equal to ..... because of corresponding angles:



A) Angle $a$	B) Angle $b$
C) Angle $c$	D) Angle $d$

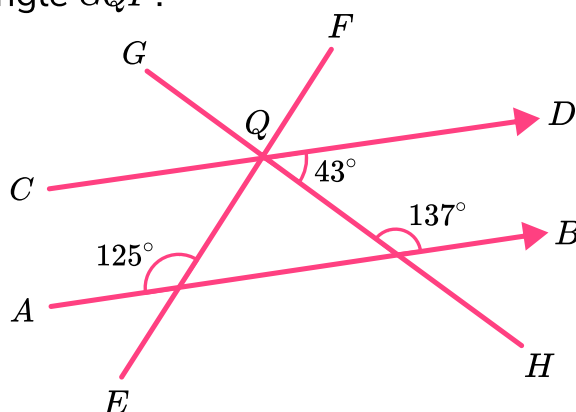
## Diagnostic Questions: Angle Facts

15. Angle  $y$  is equal to ..... because of alternate angles:



A) Angle $a$	B) Angle $b$
C) Angle $c$	D) Angle $d$

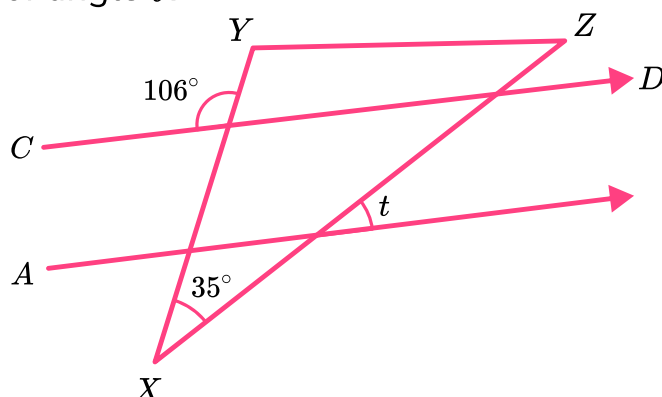
16. Lines  $AB$  and  $CD$  are parallel. Lines  $EF$  and  $GH$  intersect at point  $Q$ , which lies on  $CD$ . Find the size of angle  $GQF$ :



A) $82^\circ$	B) $94^\circ$
C) $43^\circ$	D) $98^\circ$

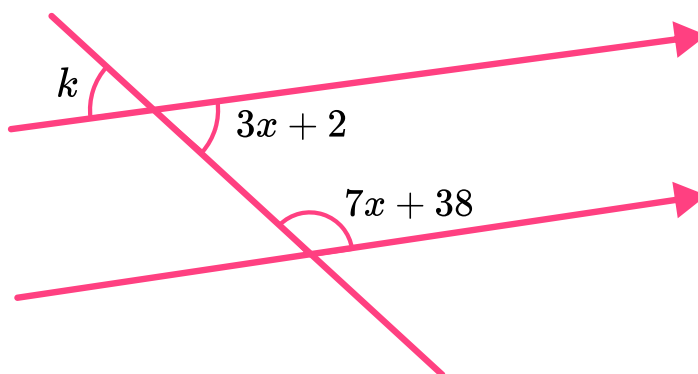
## Diagnostic Questions: Angle Facts

17. Lines  $AB$  and  $CD$  are parallel. Points  $X, Y$  and  $Z$  are the corners of a triangle. Determine the size of angle  $t$ .



A) $35^\circ$	B) $71^\circ$
C) $39^\circ$	D) $74^\circ$

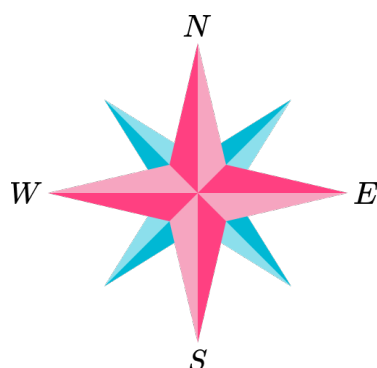
18. Determine the size of angle  $k$ :



A) $14^\circ$	B) $56^\circ$
C) $42^\circ$	D) $44^\circ$

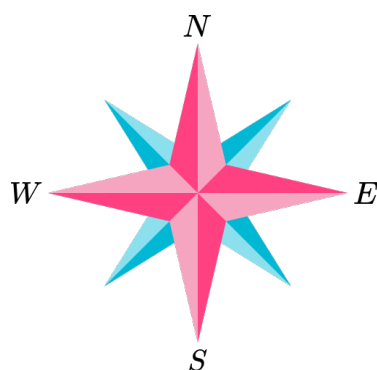
## Diagnostic Questions: Angle Facts

19. Give the three figure bearing of North-West:



A) $045^\circ$	B) $315^\circ$
C) $135^\circ$	D) $325^\circ$

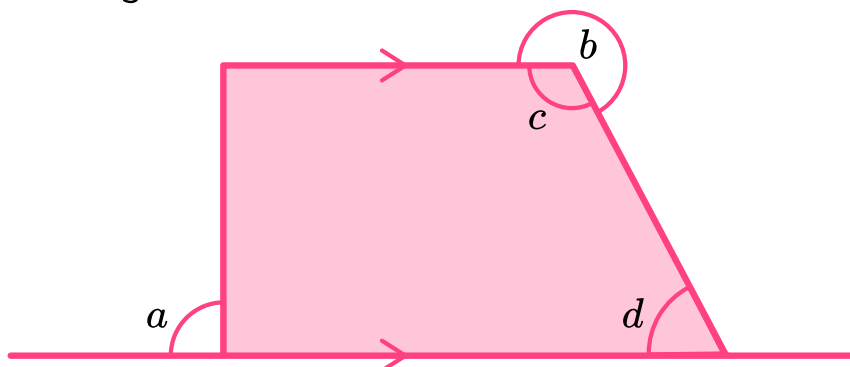
20. Give the three figure bearing of East-South-East:



A) $090^\circ$	B) $135^\circ$
C) $112.5^\circ$	D) $157.5^\circ$

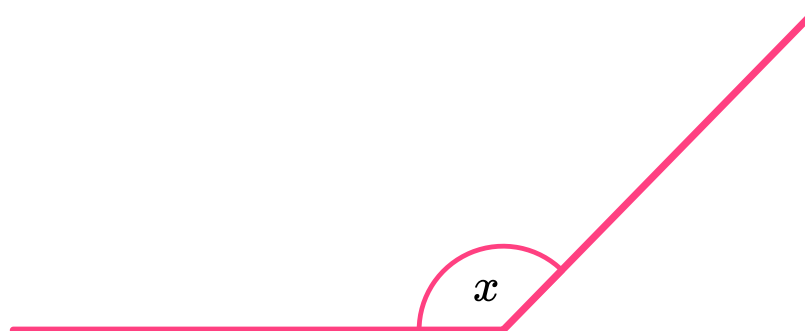
## Diagnostic Questions: Angle Facts Answers

1. Identify the acute angle:



- A) Angle  $a$  Student forgot that an acute angle is strictly less than  $90^\circ$
- B) Angle  $b$  Student chose a reflex angle
- C) Angle  $c$  Student chose an obtuse angle
- D) Angle  $d$  Correct answer

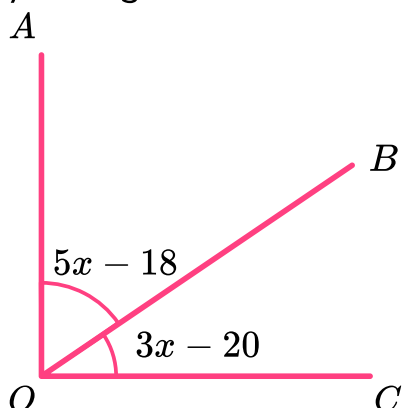
2. Select the inequality that defines an obtuse angle:



- A)  $0 < x < 180^\circ$  Student included acute angles in their inequality
- B)  $90^\circ < x < 180^\circ$  Correct answer
- C)  $90^\circ \leq x \leq 180^\circ$  Student included right-angles and straight lines
- D)  $90^\circ < x < 360^\circ$  Student included reflex angles in their inequality

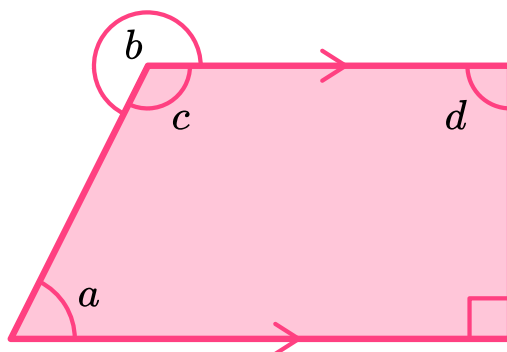
## Diagnostic Questions: Angle Facts Answers

3. Angle  $AOB$  is complementary to angle  $BOC$ . Determine the size of angle  $BOC$ :



- A)  $62^\circ$  Student found the size of angle  $AOB$
- B)  $16^\circ$  Student found the value of  $x$  but did not find the size of  $BOC$
- C)  $28^\circ$  Correct answer
- D)  $45^\circ$  Student assumed complementary meant equal

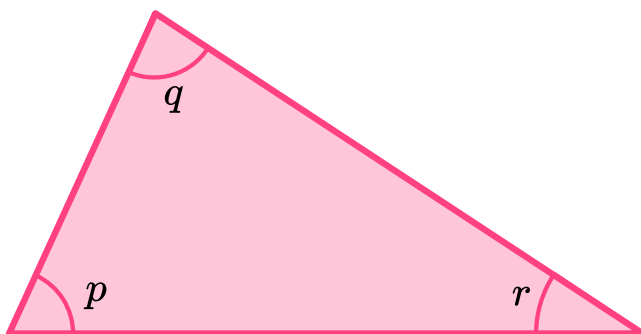
4. The shape pictured is a trapezium. Identify the reflex angle:



- A) Angle  $a$  Student chose an acute angle
- B) Angle  $b$  Correct answer
- C) Angle  $c$  Student chose an obtuse angle
- D) Angle  $d$  Student chose a right-angle

## Diagnostic Questions: Angle Facts Answers

5. What is the sum of angles  $p$ ,  $q$  and  $r$ ?



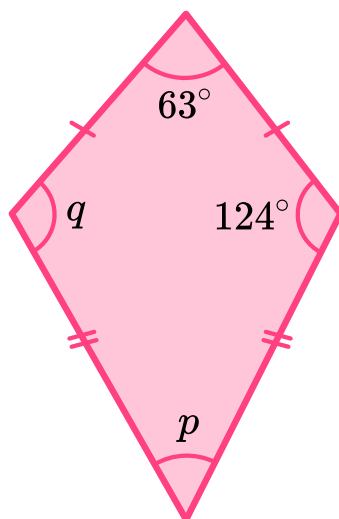
A)  $180^\circ$  Correct answer

B)  $360^\circ$  Student found the sum of angles in a quadrilateral

C)  $90^\circ$  Student stated the number of degrees in a right-angle

D)  $200^\circ$  Student lacks the understanding of angles in triangles

6. The shape pictured is a kite. Find the size of angle  $p$ :



A)  $49^\circ$  Correct answer

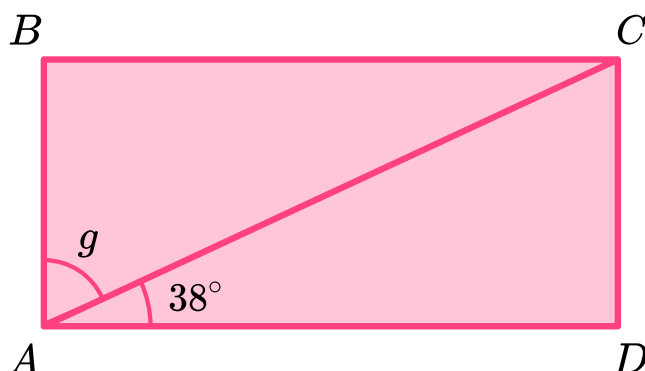
B)  $173^\circ$  Student forgot to include angle  $q$  in the sum to subtract from 360

C)  $63^\circ$  Student used the properties of a parallelogram

D)  $56^\circ$  Student subtracted 124 from 180 (incorrect shape properties)

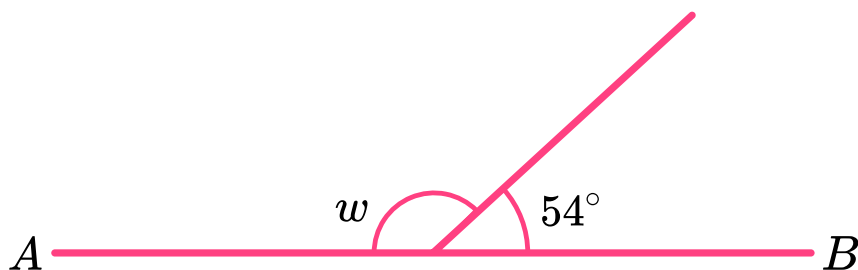
## Diagnostic Questions: Angle Facts Answers

7. Given that  $ABCD$  forms a rectangle, find the size of angle  $g$ :



- A)  $38^\circ$  Student attempted to use symmetry to equate  $g$  to angle  $CAD$
- B)  $62^\circ$  Student made an error subtracting 38 from 90
- C)  $52^\circ$  Correct answer
- D)  $142^\circ$  Student subtracted 38 from 180, instead of 90

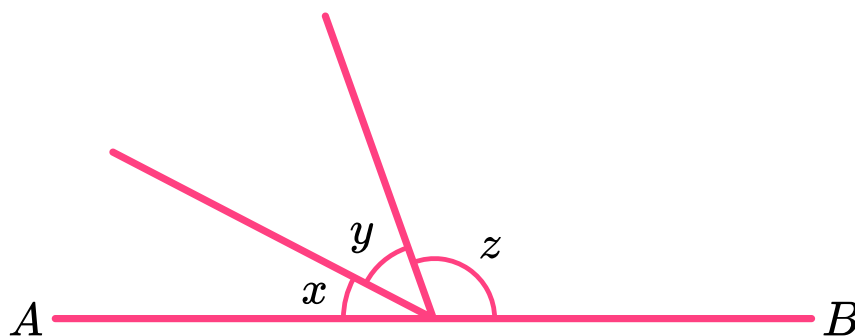
8. Given that  $AB$  is a straight line, find the size of angle  $w$ :



- A)  $136^\circ$  Student made an error subtracting 54 from 180
- B)  $36^\circ$  Student subtracted 54 from 90, instead of from 180
- C)  $108^\circ$  Student found two lots of  $54^\circ$
- D)  $126^\circ$  Correct answer

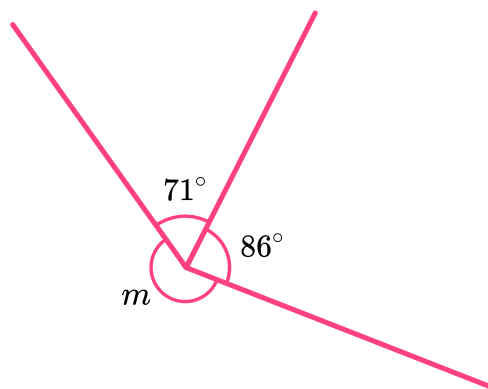
## Diagnostic Questions: Angle Facts Answers

9.  $AB$  is a straight line. The sizes of angles  $x$ ,  $y$  and  $z$  are in the ratio 2:3:7.  
Find the size of angle  $y$ :



- A)  $60^\circ$  Student divided 180 by 3  
B)  $15^\circ$  Student forgot to multiply one ratio part by 3  
C)  $45^\circ$  Correct answer  
D)  $36^\circ$  Student multiplied the number of parts on the ratio by 3

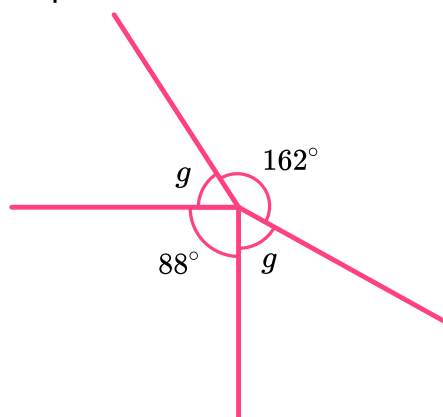
10. Three straight lines meet at a point as shown. Find the size of angle  $m$ :



- A)  $157^\circ$  Student found the sum of the known angles  
B)  $203^\circ$  Correct answer  
C)  $147^\circ$  Student subtracted the known angles from 300, not 360  
D)  $213^\circ$  Student did not regroup correctly when subtracting 157 from 360

## Diagnostic Questions: Angle Facts Answers

11. Four straight lines meet at a point. Find the size of angle  $g$ :



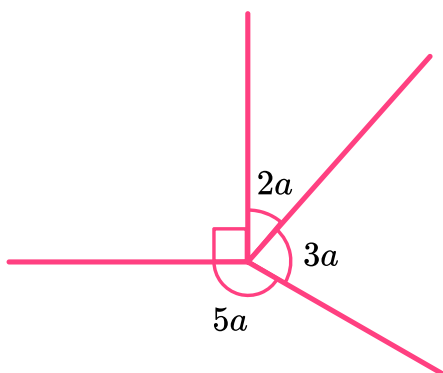
A)  $55^\circ$  Correct answer

B)  $110^\circ$  Student forgot to divide by 2

C)  $18^\circ$  Student subtracted 162 from 180, not using all of the information

D)  $74^\circ$  Student subtracted 88 from 162

12. Four lines meet at a point as shown. Find the size of the smallest angle in the diagram:



A)  $36^\circ$  Student solved the equation  $360 = 10a$

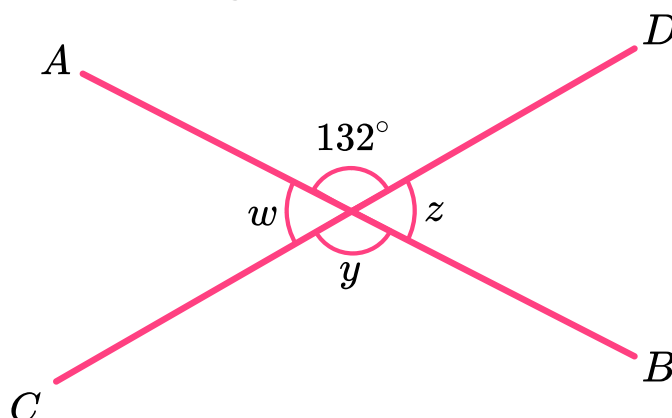
B)  $27^\circ$  Student found the correct value of  $a$  but did not multiply by 2

C)  $72^\circ$  Student forgot to subtract  $90^\circ$  from  $360^\circ$  before solving the problem

D)  $54^\circ$  Correct answer

## Diagnostic Questions: Angle Facts Answers

13. Given that  $AB$  and  $CD$  are straight lines, find the size of angle  $y$ :



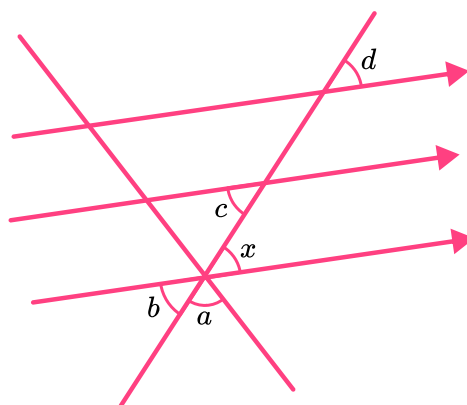
A)  $132^\circ$  Correct answer

B)  $48^\circ$  Student used angles on a straight line

C)  $228^\circ$  Student subtracted 132 from 360

D)  $264^\circ$  Student doubled the size of the known angle

14. Angle  $x$  is equal to ..... because of corresponding angles:



A) Angle  $a$  Student lacks the understanding of corresponding angles

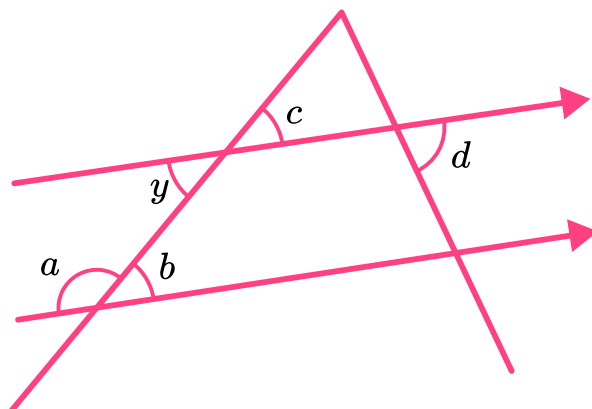
B) Angle  $b$  Student lacks the understanding of vertically opposite angles

C) Angle  $c$  Student lacks the understanding of alternate angles

D) Angle  $d$  Correct answer

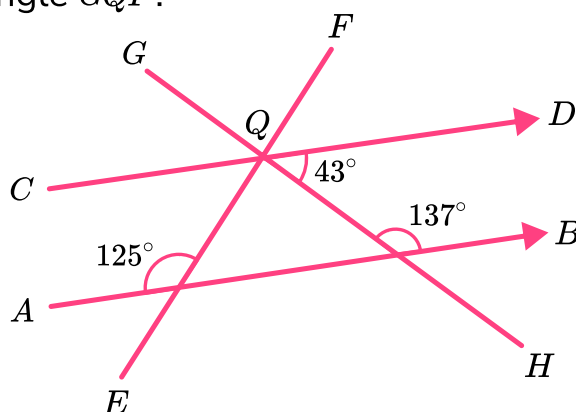
## Diagnostic Questions: Angle Facts Answers

15. Angle  $y$  is equal to ..... because of **alternate angles**:



- A) Angle  $a$  Student lacks the understanding of co-interior angles
- B) Angle  $b$  **Correct answer**
- C) Angle  $c$  Student lacks the understanding of vertically opposite angles
- D) Angle  $d$  Student lacks the understanding of alternate angles

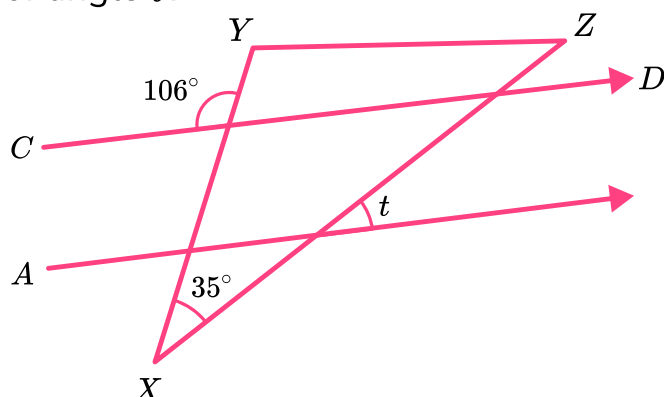
16. Lines  $AB$  and  $CD$  are parallel. Lines  $EF$  and  $GH$  intersect at point  $Q$ , which lies on  $CD$ . Find the size of angle  $GQF$ :



- A)  $82^\circ$  **Correct answer**
- B)  $94^\circ$  Student found the difference of co-interior angles  $137 - 43$
- C)  $43^\circ$  Student assumed vertically opposite angles
- D)  $98^\circ$  Student added  $CQE$  to  $DQH$ , but did not subtract from 180

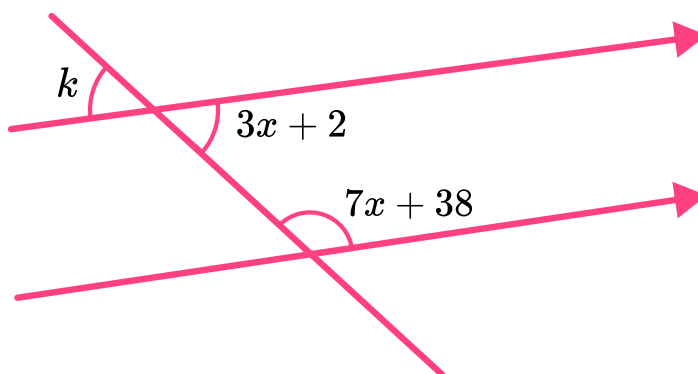
## Diagnostic Questions: Angle Facts Answers

17. Lines  $AB$  and  $CD$  are parallel. Points  $X, Y$  and  $Z$  are the corners of a triangle. Determine the size of angle  $t$ .



- A)  $35^\circ$  Student mistakenly used corresponding angles  
 B)  $71^\circ$  Student found the difference of the two known angles  
 C)  $39^\circ$  Correct answer  
 D)  $74^\circ$  Student subtracted 106 from 180

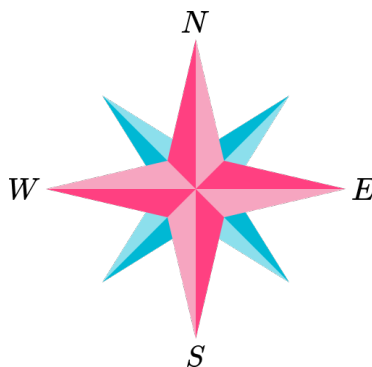
18. Determine the size of angle  $k$ :



- A)  $14^\circ$  Student obtained the value of  $x$  but did not solve the problem  
 B)  $56^\circ$  Student derived an incorrect equation to solve  $180 = 10x$   
 C)  $42^\circ$  Student forgot to add 2 to the value of  $3x$  after solving correctly  
 D)  $44^\circ$  Correct answer

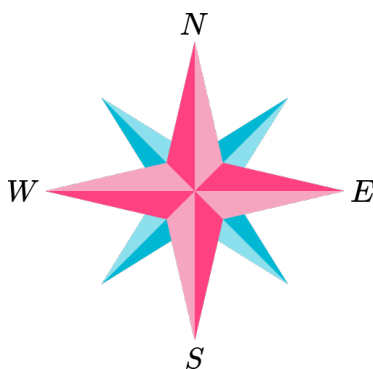
## Diagnostic Questions: Angle Facts Answers

19. Give the three figure bearing of North-West:



- A)  $045^\circ$  Student turned anti-clockwise from North
- B)  $315^\circ$  Correct answer
- C)  $135^\circ$  Student turned anti-clockwise from starting from East
- D)  $325^\circ$  Student made errors subtracting 45 from 360

20. Give the three figure bearing of East-South-East:



- A)  $090^\circ$  Student gave the bearing of East
- B)  $135^\circ$  Student gave the bearing of South-East
- C)  $112.5^\circ$  Correct answer
- D)  $157.5^\circ$  Student gave the bearing of *SSE* rather than *ESE*

# Where to go next?

For more diagnostic questions, and GCSE maths revision resources and worksheets to support students in fixing any misconceptions take a look at the free Third Space Learning [GCSE maths revision](#) pages.

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