



THIRD SPACE
LEARNING

Diagnostic Questions

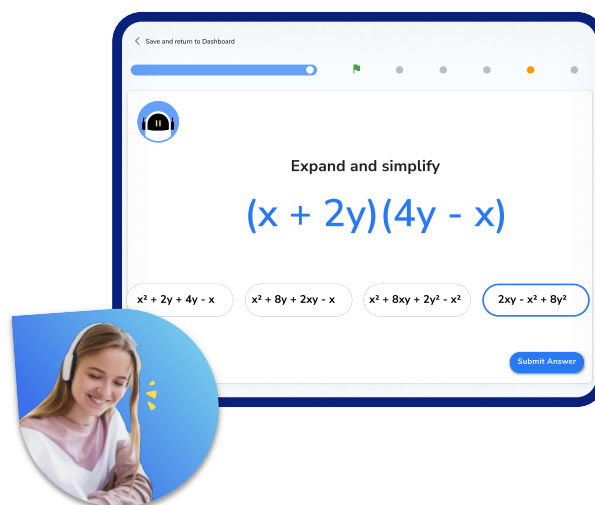
Angles in Polygons | Geometry & Measure

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 **angles in polygons** 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

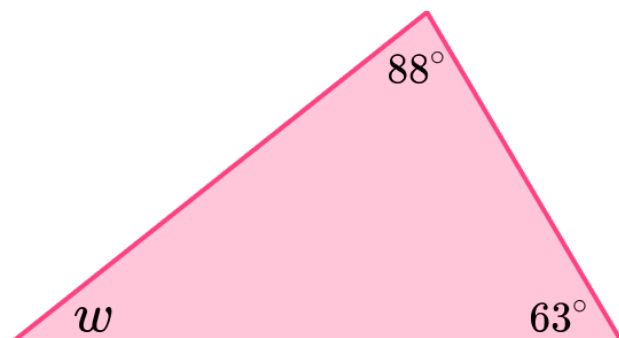
There are 20 multiple choice questions, each designed to assess each of the key skills required to master **angles in polygons**. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Angle facts**, **Forming and solving equations**, **Incorrect assumptions**, and **Substitution**.

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.

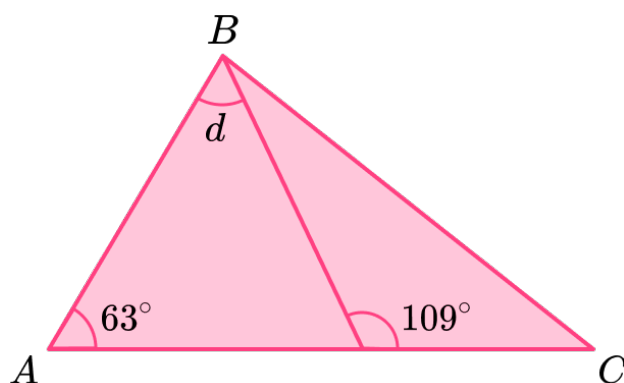
Diagnostic Questions: Angles in Polygons

1. Determine the size of angle w :



A) 49°	B) 25°
C) 29°	D) 39°

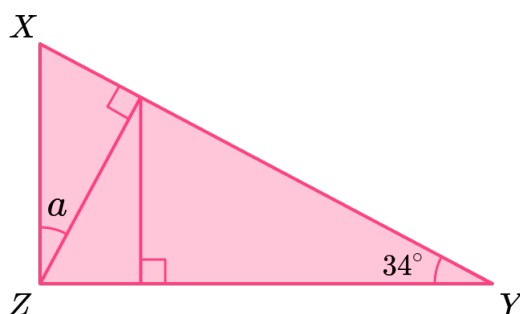
2. Figure ABC is a triangle. Determine the size of angle d :



A) 71°	B) 8°
C) 54°	D) 46°

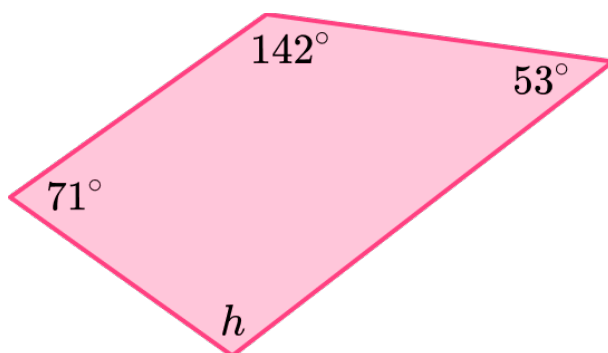
Diagnostic Questions: Angles in Polygons

3. Points X , Y and Z are the corners of a triangle such that angle XZY is a right-angle. Determine the size of angle a :



A) 56°	B) 90°
C) 34°	D) 36°

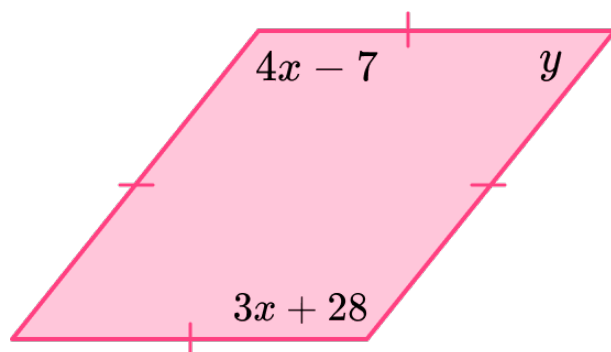
4. Determine the size of angle h :



A) 142°	B) 94°
C) 109°	D) 104°

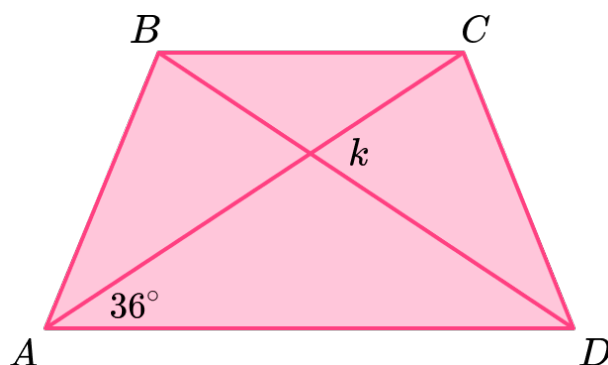
Diagnostic Questions: Angles in Polygons

5. Pictured is a rhombus. Determine the size of angle y :



A) 47°	B) 35°
C) 94°	D) 22.7°

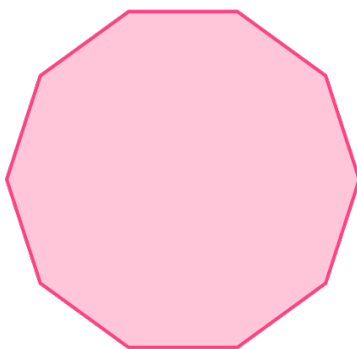
6. Given that $ABCD$ is an isosceles trapezium, determine the size of angle k :



A) 36°	B) 108°
C) 63°	D) 72°

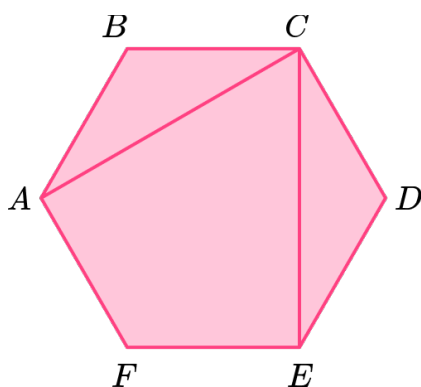
Diagnostic Questions: Angles in Polygons

7. Into how many triangles can a decagon (pictured) be divided into?



A) 10	B) 7
C) 8	D) 5

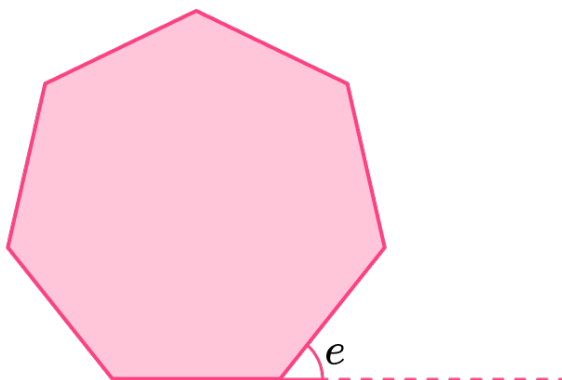
8. Given that $ABCDEF$ is a regular hexagon, determine the size of angle ACE :



A) 90°	B) 60°
C) 45°	D) 40°

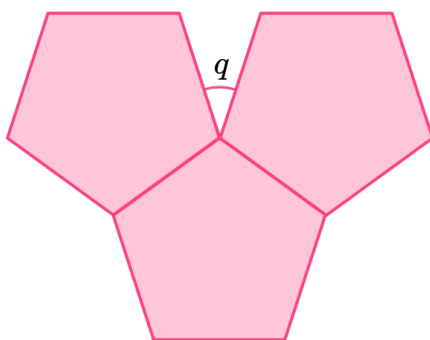
Diagnostic Questions: Angles in Polygons

9. Pictured is a regular heptagon. Determine the size of exterior angle e correct to one decimal place:



A) 25.7°	B) 128.6°
C) 51.4°	D) 42.9°

10. Three congruent regular pentagons are arranged as shown. Determine the size of angle q :



A) 30°	B) 24°
C) 18°	D) 36°

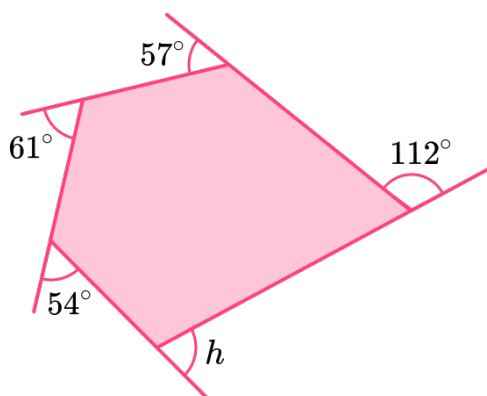
Diagnostic Questions: Angles in Polygons

11. Use the following formula to calculate the size of one interior angle A of a regular polygon with 32 sides, correct to one decimal place:

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

A) 168.8°	B) 191.2°
C) 5400°	D) 11.3°

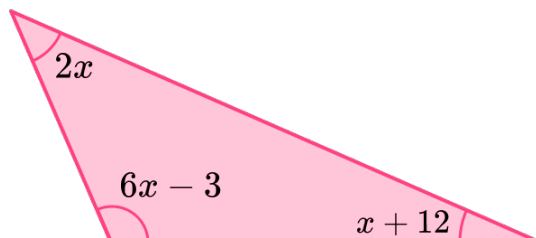
12. Use information from this irregular pentagon to find the size of angle h :



A) 68°	B) 76°
C) 71°	D) 16°

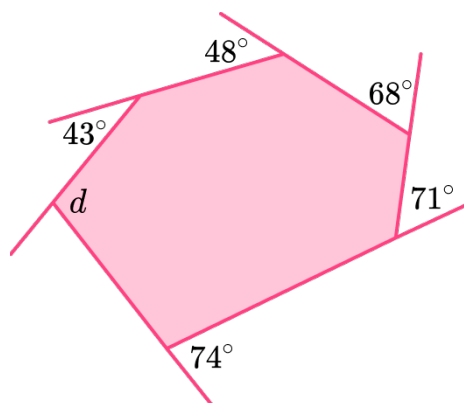
Diagnostic Questions: Angles in Polygons

13. Determine the size of the smallest angle in this triangle:



A) 38°	B) 31°
C) 32°	D) 19°

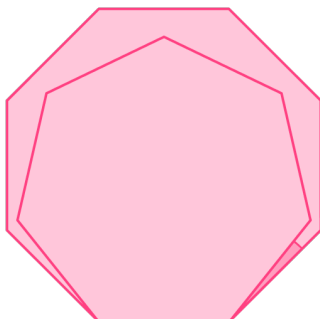
14. Determine the size of angle d :



A) 56°	B) 120°
C) 106°	D) 124°

Diagnostic Questions: Angles in Polygons

15. The base of a regular heptagon sits on the base of a regular octagon. Determine the size of the shaded angle, correct to one decimal place:



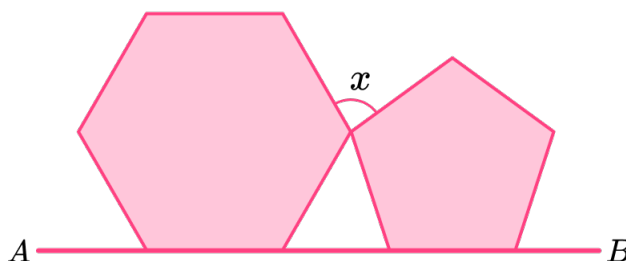
A) 15°	B) 6.5°
C) 6.4°	D) 8.6°

16. A regular n -sided polygon has an interior angle sum of 2700° . How many sides does this polygon have?

A) 17	B) 15
C) 13	D) 9

Diagnostic Questions: Angles in Polygons

17. A regular hexagon and a regular pentagon are placed as shown.
Determine the size of angle x :



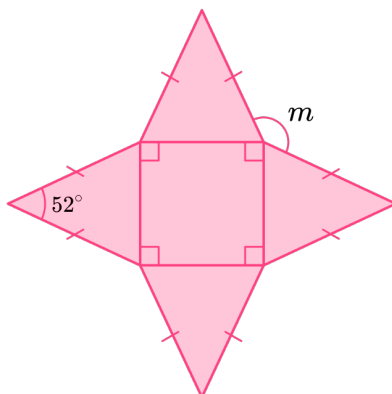
A) 90°	B) 72°
C) 84°	D) 114°

18. The interior angle of a regular n -sided polygon is 157.5°
How many sides does this polygon have?

A) 8	B) 16
C) 32	D) 20

Diagnostic Questions: Angles in Polygons

19. This is the net of a square-based pyramid. Determine the size of angle m :

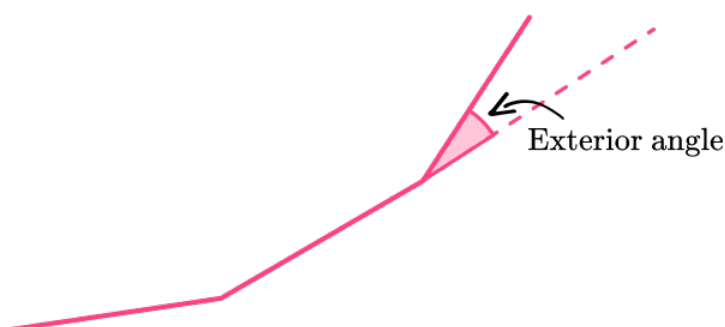


A) 128°	B) 142°
C) 166°	D) 206°

20. The diagram shows a section of a regular n -agon.

The size of the exterior angle is 11.25°

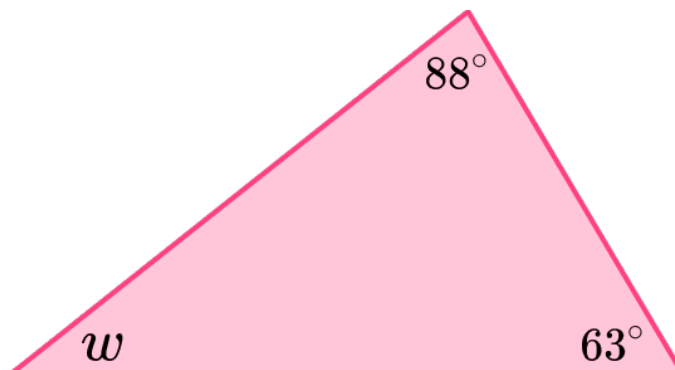
How many sides does this n -agon have?



A) 16	B) 4050
C) 32	D) 1125

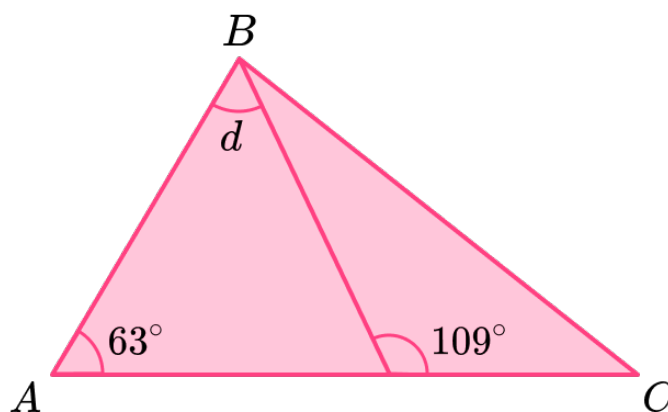
Diagnostic Questions: Angles in Polygons Answers

1. Determine the size of angle w :



- A) 49° Student used 200° as the angle sum for a triangle
- B) 25° Student found the difference of the two known angles
- C) 29° Correct answer
- D) 39° Student did not regroup correctly when subtracting $(88 + 63)$ from 180

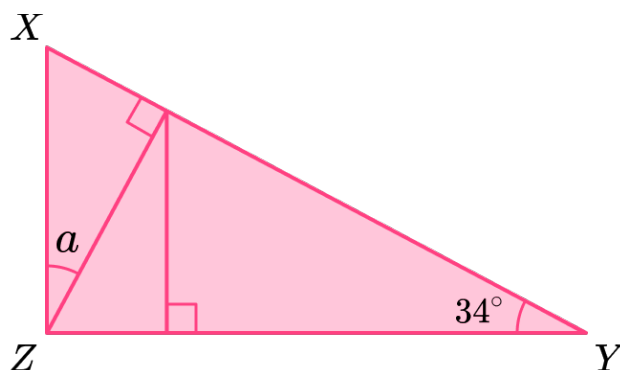
2. Figure ABC is a triangle. Determine the size of angle d :



- A) 71° Student found the angle supplementary to 109°
- B) 8° Student subtracted the two known angles from 180°
- C) 54° Student assumed d was opposite the base of an isosceles triangle
- D) 46° Correct answer

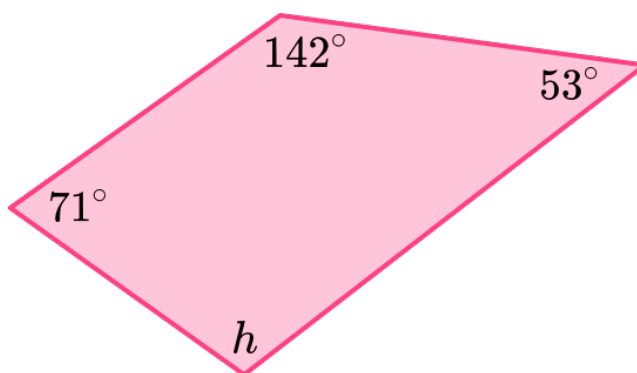
Diagnostic Questions: Angles in Polygons Answers

3. Points X , Y and Z are the corners of a triangle such that angle XYZ is a right-angle. Determine the size of angle a :



- A) 56° Student found the complement to 34°
 B) 90° Student restated the size of angle XYZ
 C) 34° Correct answer
 D) 36° Student made a calculation error

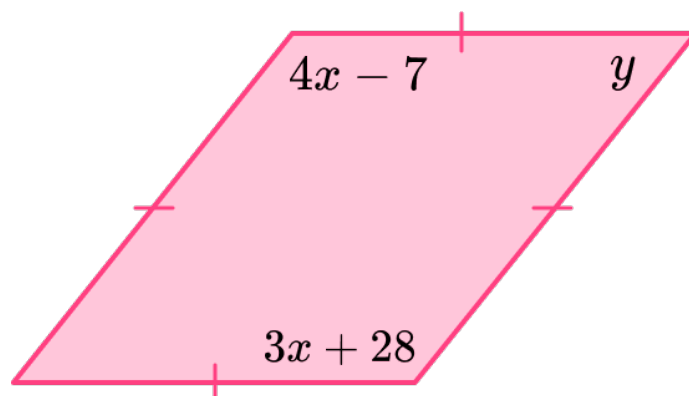
4. Determine the size of angle h :



- A) 142° Student assumed opposite angles in any quadrilateral are equal
 B) 94° Correct answer
 C) 109° Student assumed 71° and h are supplementary
 D) 104° Student found the sum of the three known angles but made errors subtracting from 360°

Diagnostic Questions: Angles in Polygons Answers

5. Pictured is a rhombus. Determine the size of angle y :



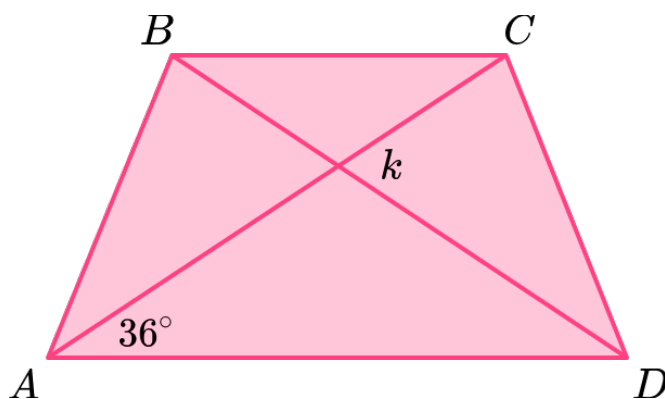
A) 47° Correct answer

B) 35° Student gave the solved value for

C) 94° Student found two lots of the value of y

D) 22.7° Student lacks understanding (solved $7x + 21 = 180$)

6. Given that $ABCD$ is an isosceles trapezium, determine the size of angle k :



A) 36° Student mistakenly assumed angle CAD and k are corresponding angles

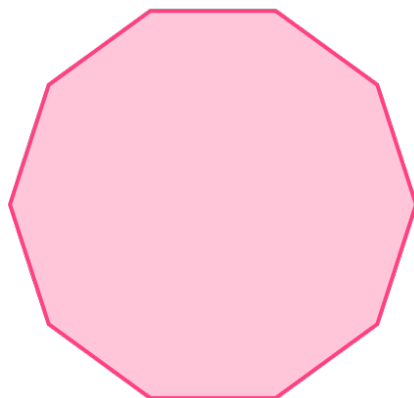
B) 108° Student found the angle supplementary to k

C) 63° Student does not understand how to solve the problem

D) 72° Correct answer

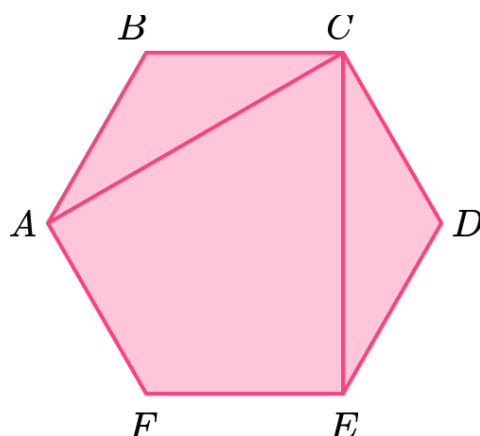
Diagnostic Questions: Angles in Polygons Answers

7. Into how many triangles can a decagon (pictured) be divided into?



- A) 10 Student assumed n -sided polygons can be divided into n triangles
- B) 7 Student subtracted the number of sides on a triangle from the number of sides on a decagon
- C) 8 Correct answer
- D) 5 Student halved the number of sides on a decagon

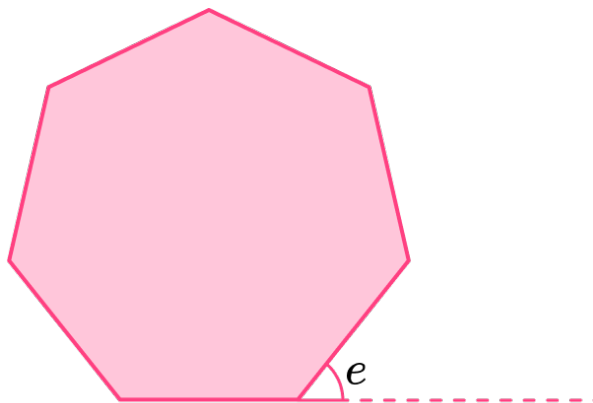
8. Given that $ABCDEF$ is a regular hexagon, determine the size of angle ACE :



- A) 90° Student worked out the size of angle CAF (or CEF)
- B) 60° Correct answer
- C) 45° Student divided 180° by 4
- D) 40° Student divided one interior (120°) angle by 3

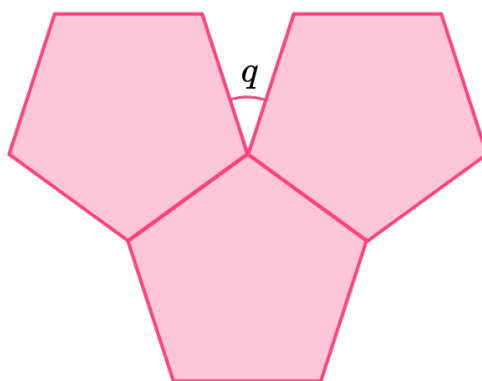
Diagnostic Questions: Angles in Polygons Answers

9. Pictured is a regular heptagon. Determine the size of exterior angle e correct to one decimal place:



- A) 25.7° Student used 180° as the sum of exterior angles
B) 128.6° Student found the size of one interior angle
C) 51.4° Correct answer
D) 42.9° Student used 300° as the sum of exterior angles

10. Three congruent regular pentagons are arranged as shown. Determine the size of angle q :



- A) 30° Student found one interior angle of a pentagon to be 110°
B) 24° Student divided the size of a pentagon's exterior angle by 3
C) 18° Student divided the size of a pentagon's exterior angle by 4
D) 36° Correct answer

Diagnostic Questions: Angles in Polygons Answers

11. Use the following formula to calculate the size of one interior angle A of a regular polygon with 32 sides, correct to one decimal place:

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

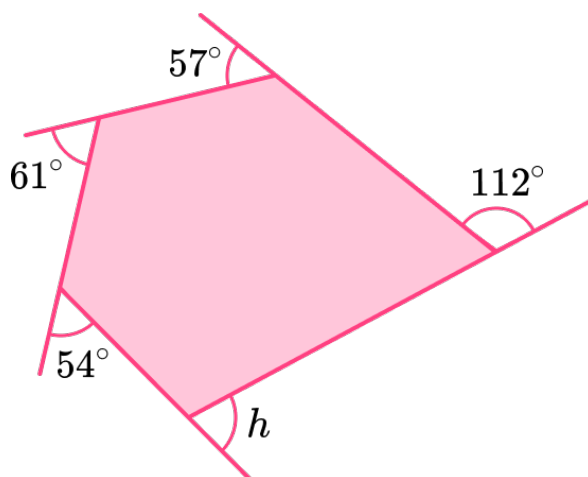
A) 168.8° Correct answer

B) 191.2° Student added 2, rather than subtracting 2

C) 5400° Student found the sum of interior angles (did not divide by 32)

D) 11.3° Student found the size of one exterior angle

12. Use information from this irregular pentagon to find the size of angle h :



A) 68° Student subtracted 112° from 180° (using one other angle only)

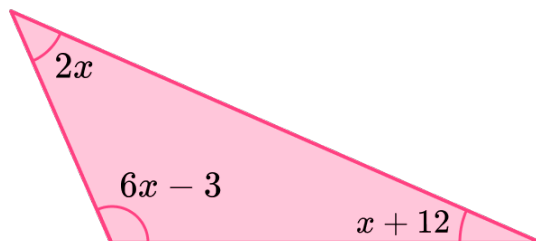
B) 76° Correct answer

C) 71° Student calculated the mean of the four known angles

D) 16° Student used 300° as the sum of exterior angles

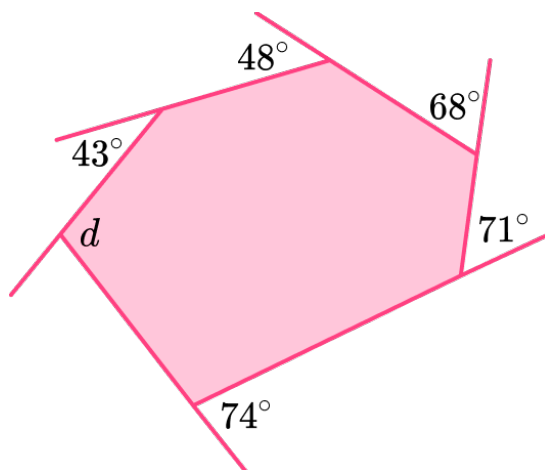
Diagnostic Questions: Angles in Polygons Answers

13. Determine the size of the smallest angle in this triangle:



- A) 38° Student forgot to check the size of both acute angles
- B) 31° Correct answer
- C) 32° Student found the value of x to be 20
- D) 19° Student stated the value of x

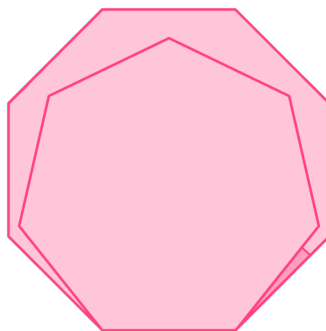
14. Determine the size of angle d



- A) 56° Student found the angle supplementary to d
- B) 120° Student found the size of one interior angle of a regular hexagon
- C) 106° Student subtracted 74° from 180° (looking at the wrong angle)
- D) 124° Correct answer

Diagnostic Questions: Angles in Polygons Answers

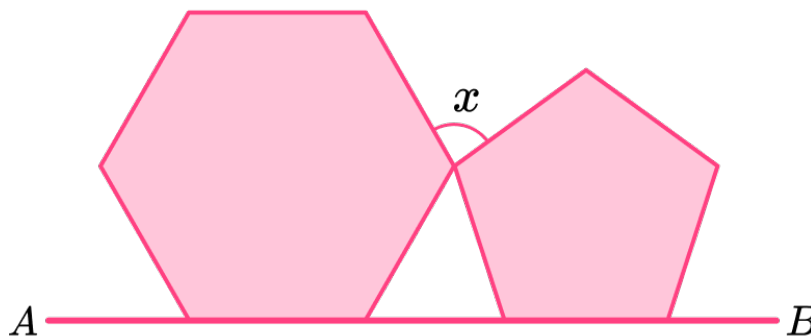
15. The base of a regular heptagon sits on the base of a regular octagon. Determine the size of the shaded angle, correct to one decimal place:



- A) 15° Student used the angle measures for a hexagon, not a heptagon
B) 6.5° Student introduced a rounding error calculating the heptagon's interior angle
C) 6.4° Correct answer
D) 8.6° Student used 120° as the interior angle of an octagon
-
16. A regular n -sided polygon has an interior angle sum of 2700° . How many sides does this polygon have?
- A) 17 Correct answer
B) 15 Student divided 2700 by 180 but did not complete the solution
C) 13 Student inverted operations incorrectly when solving the problem
D) 9 Student made incorrect assumptions about interior angle properties

Diagnostic Questions: Angles in Polygons Answers

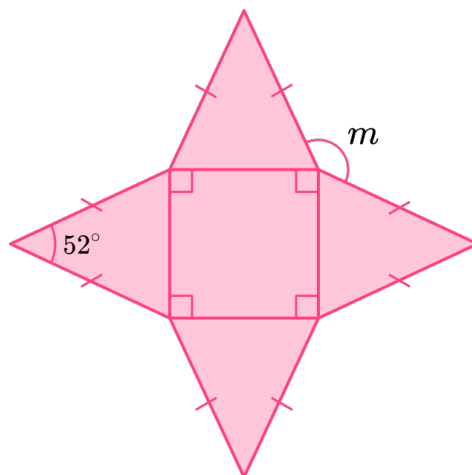
17. A regular hexagon and a regular pentagon are placed as shown.
Determine the size of angle x :



- A) 90° Student assumed right angle without calculation
B) 72° Student thought the enclosed triangle was equilateral
C) 84° Correct answer
D) 114° Student made errors subtracting 276 from 360
-
18. The interior angle of a regular n -sided polygon is 157.5°
How many sides does this polygon have?
- A) 8 Student used correct formula but expanded bracket incorrectly
B) 16 Correct answer
C) 32 Student made a calculation error solving the problem
D) 20 Student made several errors whilst solving

Diagnostic Questions: Angles in Polygons Answers

19. This is the net of a square-based pyramid. Determine the size of angle m :

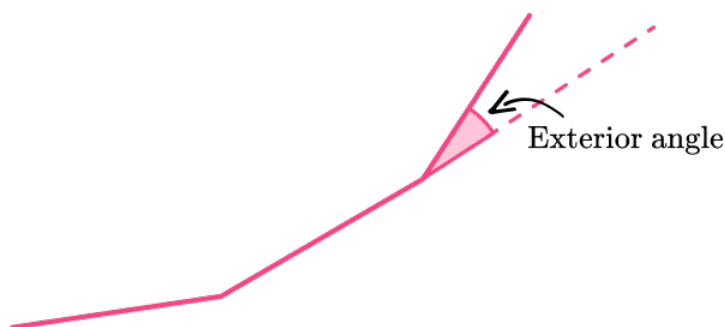


- A) 128° Student found the sum of the base angles of one triangle
- B) 142° Correct answer
- C) 166° Student used 52° as the base angles of the isosceles triangles
- D) 206° Student did not subtract all necessary angles from 360°

20. The diagram shows a section of a regular n -agon.

The size of the exterior angle is 11.25°

How many sides does this n -agon have?



- A) 16 Student used 180° as the sum of exterior angles
- B) 4050 Student multiplied (instead of dividing) 360 by 11.25
- C) 32 Correct answer
- D) 1125 Student lacks understanding of exterior angles

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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