

Shape Prior Assessment Question 10

Objective: I can calculate missing angles.

NC SH 5. recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

NC SH3 Find unknown angles in any triangles, quadrilaterals and regular pentagons.

Teacher Input Ideas:

Recap with the children how angles can be measured and ensure that the children are confident with this skill. Encourage children to show others and ensure that protractors or angle measures are being used correctly. Ask the children to create a quick set of instructions as a class with 5 steps to using a protractor accurately.

Now look at Question 10 of the prior learning assessment and discuss the word calculate. What does this mean? What am I being expected to do here? How does this question differ from Question 9?

Establish that the children are required to work out the size of the angle rather than measure the size of the angle. Discuss what facts the children know about angles in shapes. Give the children time to quickly mind map as a group any facts they know. Now look at the images in Q10 and model using these facts to calculate the answer.

For example, Q10a, what do we know about the angles in parallelograms?

Encourage the children to understand that the angles all should add to 360 degrees.

What else do we know about the types of angles they contain? Discuss that a parallelogram has 2 acute equal angles and 2 obtuse equal angles. So, what information have I got and what information do I know. Allow the children time to work out that $360 - 75 - 75 = 210$.

So, the 2 obtuse angles must add to 210. 210 divided by 2 = 105. Angle a = 105 degrees.

Look at the other images with the children encouraging more independence as they progress.

Practice Activities

Purple Practice: most suited for children who made errors in Question 10 c, d and e and will benefit from securing understanding of finding missing angles in quadrilaterals and triangles.

Children are required to use their knowledge of the properties of quadrilaterals and triangles and use the angles provided in the images to calculate the missing angles.

Encourage the children to spot any links between the angles which are the same size, for example in a parallelogram, the acute angles are the same size as each other and so are the obtuse angles.

Children could also label the shapes with their names and properties, including the types of angles, such as acute and obtuse to apply prior learning.

Green Practice: most suited for children who made errors in Question 9a and b of the prior learning assessment.

For this activity, the children are to apply their understanding that a straight line is half a turn, resulting in the total size of the angles being 180° . Children are to use this knowledge and the measurements of angles they are provided with in the image to calculate the missing angles. Additionally, the children should be able to calculate angles that are opposite to each other and when they total 360 around the whole turn.

Yellow Practice Most suited for who can accurately answer Question 10 a - e and would benefit from further developing their understanding of the angles in regular polygons.

The children should apply their knowledge of total size of angles in quadrilaterals and triangles to help them to understand the size of the angles in regular polygons. This activity is to encourage the children to discover and explain the total number of angles, by identifying how many quadrilaterals and triangles can be used to split the shapes. Encourage the children to look at each polygon and try to split it into quadrilaterals and triangles. For example, a pentagon can be made using a trapezium and a triangle. The children could draw lines to create these. So, a quadrilateral has a total of 360 degrees and a triangle has a total of 180 degrees. When I combine these amounts, the total is 540 degrees. Encourage the children to discover this by drawing lines on to the shape and then encourage the children to use their reasoning to explain this to other children. Finally, the children can work out the size of each angle in each regular polygon.

Mastery: For the first question the children are required to combine a variety of skills to complete an accurate drawing of a parallelogram. The children will need to measure the angle they have and then use their knowledge of shape and total size of angles to calculate the acute angles. The children are required to use a protractor to accurately draw each angle to complete the shape.

For the second problem, the children are given an image with a rhombus on a straight line. The children are required to use their knowledge of angles on a line and in a rhombus to calculate the missing angle.

There are different approaches to this problem. For example:

- some may calculate the missing acute angle in the rhombus by using the 107° ($360 - 107 - 107 = 146$. 146 divided by $2 = 73^\circ$) Then they may take the 73 away from 180 for the straight line to find the answer of 107° .
- Some children may have discovered that 1 obtuse and 1 acute angle in a rhombus both equal to 180° , therefore the opposite angle must be 107° too as it would be the same.

Answers:

Purple:

- | | | | |
|---------------|---------------|---------------|----------------|
| 1) 40° | 2) 18° | 3) 55° | 4) 73° |
| 5) 56° | 6) 32° | 7) 61° | 8) 105° |

Green:

- | | | | |
|---------------|----------------|---------------|----------------|
| 1) 98° | 2) 26° | 3) 29° | 4) 274° |
| 5) 45° | 6) 225° | | |

Challenge: 72°

Yellow:

- | | | | |
|----------------|----------------|----------------|----------------|
| 1) 360° | 2) 360° | 3) 360° | 4) 180° |
|----------------|----------------|----------------|----------------|

- | | |
|---|---|
| 1) 540° (each angle: 108°) | 2) 720° (each angle: 120°) |
|---|---|

- 3) 1080° (each angle: 135°)

Mastery:

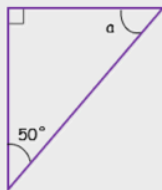
- 1) Encourage children to measure each other's for accuracy
- 2) 107°

Purple activity

LO: I find missing angles in quadrilaterals and triangles.

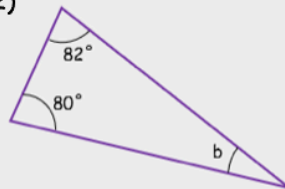
Look at each image and find the missing angles.

1)



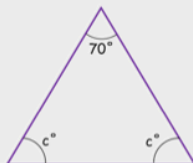
$a = \quad ^\circ$

2)



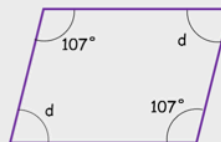
$b = \quad ^\circ$

3)



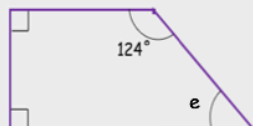
$c = \quad ^\circ$

4)



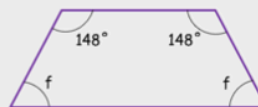
$d = \quad ^\circ$

5)



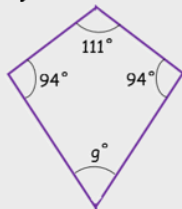
$e = \quad ^\circ$

6)



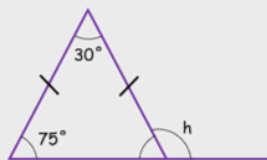
$f = \quad ^\circ$

7)



$g = \quad ^\circ$

8)

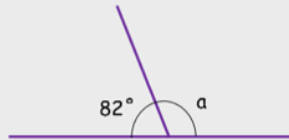


$h = \quad ^\circ$

Challenge: Can you label each angle?
For example: acute

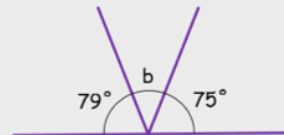
Look at each image and find the missing angles.

1)



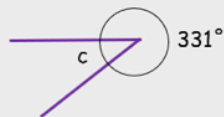
$a = \quad ^\circ$

2)



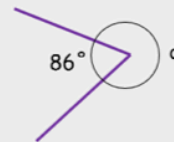
$b = \quad ^\circ$

3)



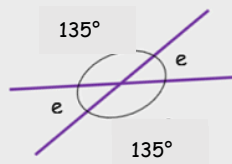
$c = \quad ^\circ$

4)



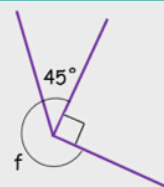
$d = \quad ^\circ$

5)



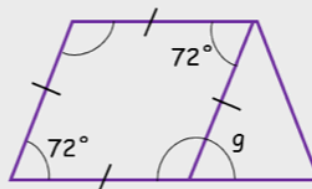
$e = \quad ^\circ$

6)



$f = \quad ^\circ$

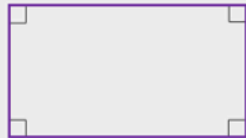
Challenge:



$g = \quad ^\circ$

Look at the first 4 shapes. Name them and work out the total of the angles in each shape.

1)



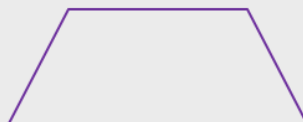
Total angles= °

2)



Total angles= °

3)



Total angles= °

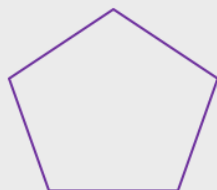
4)



Total angles= °

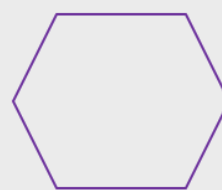
Now use this knowledge to look at each of the shapes below. Label the shapes. What other shapes can be used to create this shape. Use this to work out total number of angles in each of the regular polygons below.

1)



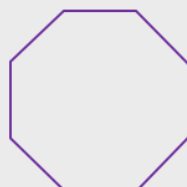
Total angles= °

2)



Total angles= °

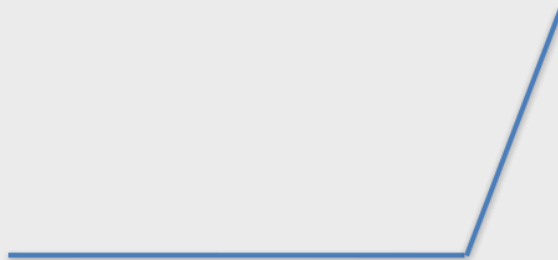
3)



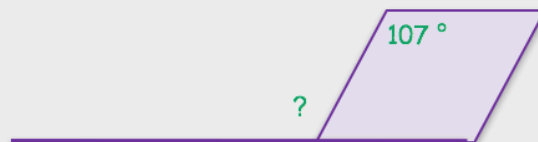
Total angles= °

Challenge: Now work out the size of each angle in the 3 regular polygons. Use these models to explain to a friend.

- 1) Look at the image below. Complete the parallelogram using the starting line and angle you have. (You will need a protractor to ensure you have accurate angles.)



- 2) Calculate the missing angle:



? = °