Using angle sum facts

National Curriculum attainment target

• Use the properties of rectangles to deduce related facts and find missing lengths and angles

Lesson objective

• Use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems

Previous related lessons

Unit 9, Week 3, Lesson 1; Unit 9, Week 3, Lesson 2; Unit 9, Week 3, Lesson 3

Prerequisites for learning

Pupils need to:

- \bullet know that an acute angle is less than a right angle and is more than 0° and less than 90°
- \bullet know that an obtuse angle is less than a straight line, is greater than a right angle and is more than 90° and less than 180°
- \bullet know that a reflex angle is greater than a straight line and is more than 180° and less than 360°

Vocabulary

angle (\angle), acute, obtuse, reflex, right, degrees (°), protractor

Future related lessons

None

Success criteria

Pupils can:

- make deductions about missing angles using angle sum facts
- relate the calculations for missing angles to missing number problems



Collins Connect

Year 5, Unit 9, Week 3

Getting Started

Choose an activity from Geometry - Properties of shapes.

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Resources

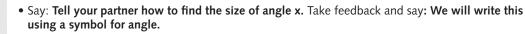
mini whiteboard, pen and eraser (per child)

- Ask: Between which two measures does:
 - an acute angle lie? (between 0° and 90°)
 - an obtuse angle lie? (between 90° and 180°)
 - a reflex angle lie? (between 180° and 360°)



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- Display: Slide 1 showing the right angle diagram.
 Ask: What can you deduce about the sizes of angles a and b? (∠a + ∠b = 90°)
- Ask: What kind of angle is angle c and what size is it? (reflex angle c is 270°) How did you find your answer? Take feedback and establish that:
 - angle c together with angles A and B make one full turn or 360°
 - angles a + b = 90°
 - angle c is equal to 360° 90° or 270°
 - angle c is equal to three right angles or $3 \times 90^\circ = 270^\circ$.
- Say: Angle a measures 25°. What is the size of angle b? ($\angle b = 90^\circ 25^\circ = 65^\circ$)
- Display: Slide 2 showing the missing angle diagram for the right angle.



- Write on the board: $\angle x = 90^{\circ} 35^{\circ} = 55^{\circ}$
- Display: Slide 3 showing the straight line diagram.
- Ask: What can you deduce about the sizes of angles d and e? ($\angle d + \angle e = 180^\circ$)

- Ask: What kind of angle is angle f and what size is it? (straight angle f = 180°)
- Ask: If angle d measures 50°, what is the size of angle e? (obtuse angle $e = 180^\circ 50^\circ = 130^\circ$)
- Ask: What is the size of the reflex angle formed by angles e and f? (310°) How did you find the answer?
- Say: Tell your partner the size of the reflex angle formed by angles d and f. $(50^\circ + 180^\circ = 230^\circ)$
- Ask: Who had a different way to calculate the answer? (subtract angle e from one full turn:
- $360^{\circ} 130^{\circ} = 230^{\circ}$) Take feedback and agree that this method involves less calculation.
- Display: Slide 4 showing the missing angle diagram for the straight line.
- Ask: What steps do we need to take to find the size of the missing angle y?
- Write on the board: $39^\circ + 66^\circ = 105^\circ$

$$z = 105$$

 $z = 180^{\circ} - 105^{\circ}$
 $= 75^{\circ}$

- Give different values for the two angles and ask the children to use their whiteboards to calculate the size of the missing angle y.
- Display: Slide 5 showing the missing angle diagram for the angles in one full turn.
- Ask: What type of angle is the anticlockwise angle ABD? (reflex angle) How do we calculate the size of angle ABD?
- Write on the board: $55^{\circ} + 90^{\circ} = 145^{\circ}$ $\angle ABD = 360^{\circ} - 145^{\circ}$ $= 215^{\circ}$
- Ask: What will happen to the size of angle ABD if we increase the size of angle CBD by 15°? (the size of ∠ABD will decrease by 15°)

Individualised Learning

Refer to Activity 4 from the Learning activities on page 373.

Pupil Book 5C: – Page 26: Missing angles Resources: Geometry Set tool (per pair), protractor (per child), ruler (per child), plastic circle or pair of compasses (Challenge 3, per child) Progress Guide 5: – Support, Year 5, Unit 9, Week 3, Lesson 4: Mountain bike rally angles

Plenary

- Discuss the strategies that the children used to calculate the sizes of the missing angles.
- Ask: How can you check that the calculation that you have made is correct? (by using the inverse operation)
- Say: In a diagram the missing angle is an obtuse angle. Between which values should the size of the angle lie? (between 90° and 180°) Between which values would you expect a missing angle that is a reflex angle to lie? (between 180° and 360°)

Homework Guide 5

Year 5, Unit 9, Week 3, Lesson 4: Angles in a regular hexagon

Overcoming Barriers

• Ask the child to state which type of angle the missing angle is and to check that the answer lies within the range of degrees for that type of angle.



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