

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:

- know that an acute angle is less than a right angle and is more than 0° and less than 90°
- 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°
- 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 ($^\circ$), 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



Getting Started

Choose an activity from Geometry – Properties of shapes.

Teach

Resources

mini whiteboard, pen and eraser (per child)

**Collins
Connect**
Year 5, Unit 9,
Week 3



- 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°)

- Display: Slide 1 showing the right angle diagram.

- Ask: **What can you deduce about the sizes of angles a and b?** ($\angle a + \angle b = 90^\circ$)

- 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 $a + b = 90^\circ$
- angle c is equal to $360^\circ - 90^\circ$ 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.

- Say: **Tell your partner how to find the size of angle x.** Take feedback and say: **We will write this using a symbol for 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 $f = 180^\circ$)
- 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:

$$39^\circ + 66^\circ = 105^\circ$$

$$\angle y = 180^\circ - 105^\circ$$

$$= 75^\circ$$



- 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 $\angle ABD$ 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.