Measuring Angles in Degrees

Reasoning and Problem Solving

Which angle is the odd one out?

180°	45°	79°	270°

Could another angle be the odd one out for a different reason?

Always, sometimes or never true?

- If I turn from North-East to North-West, I have turned 90°
- If I turn from East to North-West, I will have turned through an obtuse angle.
- If I turn from South-West to South, my turn will be larger than 350°

Pick a starting point on the compass and describe a turn to your partner. Use the mathematical words to describe your turns:

- Clockwise
- Anti-clockwise
- Degrees
- Acute
- Obtuse
- Reflex
- Right angle

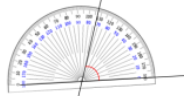Can your partner identify where you will finish?

4

Measuring with a Protractor (1)

Reasoning and Problem Solving

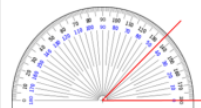I have measured the angle correctly because my protractor is the right way round.

Teddy

Whitney

I have measured the angle correctly because my protractor is on the line accurately.

Who do you agree with?
Explain why.

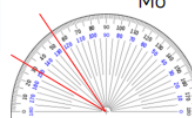Three children are measuring angles. Can you spot and explain their mistake?

My angle measures 135°

Mo

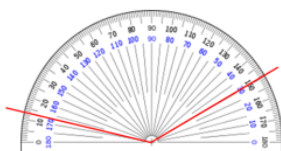My angle measures 55°

Dora

My angle measures 35°

Alex

6

Measuring with a Protractor (2)

Reasoning and Problem Solving

Rosie is measuring an obtuse angle. What's her mistake?

How many ways can you find the value of the angle?

Use a cut out of a circle and place a spinner in the centre.

- Point the arrow in the starting position above.
- Move the spinner to try to make the angles shown on the cards below.
- Check how close you are with a protractor.

| 40° | 72° | 154° |

Drawing Accurately

Reasoning and Problem Solving

Draw a range of angles for a friend.
Estimate the sizes of the angles to order them from smallest to largest.
Measure the angles to see how close you were.

Always, sometimes or never true?

- Two acute angles next to each other make an obtuse angle.
- Half an obtuse angle is an acute angle.
- 180° is an obtuse angle

Use Kandinsky's artwork to practice measuring lines and angles.

Create clues for your partner to work out which line or angle you have measured.

Angles on a Straight Line

Reasoning and Problem Solving

Here are two angles.

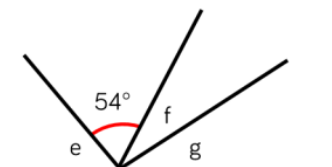Angle b is a prime number between 40 and 50

Use the clue to calculate what the missing angles could be.

Jack is measuring two angles on a straight line.

My angles measure 73° and 108°

Explain why at least one of Jack's angles must be wrong.

- The total of angle f and g are the same as angle e
- Angle e is 9° more than the size of the given angle.
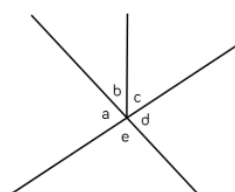- Angle f is 11° more than angle g

Calculate the size of the angles.

Create your own straight line problem like this one for your partner.

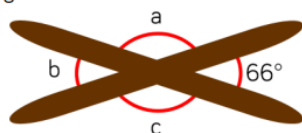12

Angles around a Point

Reasoning and Problem Solving

$a + b + c + d + e = 360°$
$d + e = 180°$
Write other sentences about this picture.

Two sticks are on a table.
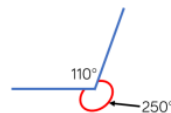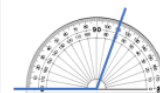Without measuring, find the three missing angles.

Eva says,

My protractor only goes to 180 degrees, so I can't draw reflex angles like 250 degrees.

Rosie says,

I know a full turn is 360 degrees so I can draw 110 degrees instead and have an angle of 250 degrees as well.
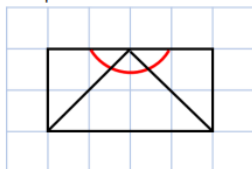

Use Rosie's method to draw angles of:
- 300°
- 200°
- 280°

14

Lengths and Angles in Shapes

Reasoning and Problem Solving

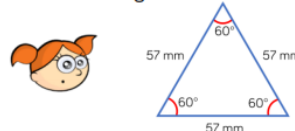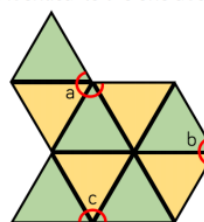Whitney is calculating the missing angles in the shape.

She says,

The missing angles are 60 degrees because $180 \div 3 = 60$

Do you agree?
Explain why.

Alex has this triangle.

57 mm   57 mm   60°

60°   60°

57 mm

She makes this composite shape using triangles identical to the one above.

a

b

c

- Calculate the perimeter of the shape.
- Calculate the missing angles.

Use your own triangle, square or rectangle to make a similar problem?

16
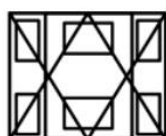

Regular & Irregular Polygons
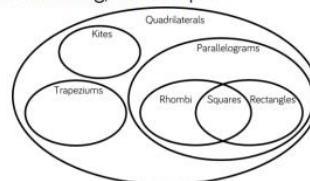
Reasoning and Problem Solving

Always, sometimes or never true?

- A regular polygon has equal sides but not equal angles.
- A triangle is a regular polygon.
- A rhombus is a regular polygon.
- The number of angles is the same as the number of sides in any polygon.

How many regular and irregular polygons can you find in this picture?

Cut out lots of different regular and irregular shapes. Ask children to work in pairs and sort them into groups. Once they have sorted them, can they find a different way to sort them again? Children could use Venn diagrams and Carroll diagrams to deepen their understanding, for example:

Quadrilaterals

Kites

Parallelograms

Trapeziums

Rhombi   Squares   Rectangles

	Regular polygon	Irregular polygon
Has at least one right angle		
Has no right angles		

18

Reasoning about 3-D Shapes

Reasoning and Problem Solving

Amir says,

> If two 3-D shapes have the same number of vertices, then they also have the same number of edges.
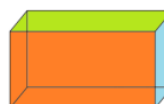
Do you agree?
Explain why.

Create cubes and cuboids by using multilink cubes.
Draw these on isometric paper.
Would it be harder if you had to draw something other than squares or rectangles?

Using different 3-D solids, how can you represent them from different views?
Work out which representation goes with which solid.

For example,

Front view

Side view

Plan view

20