

In partnership with



# STRIDE INTO *THE FUTURE* OF ASSESSMENT

Teacher Companion Guide

Shapes



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## Overview

Stride is a new offering from AQA which is designed to empower students and quickly identify and close their knowledge gaps in mathematics. Designed to help students starting their GCSEs – either for the first time or as a resit – the tests are accessible for all and adapt to students' knowledge, delivering the right amount of challenge.

Our new maths tests will allow teachers to pinpoint gaps in their students' conceptual knowledge - saving them time and empowering students, who will understand how to improve. They're fully funded for schools and colleges, easy to use for teachers and engaging for students.

The five short tests, created with the [Key Stage 1 and 2](#) and [Key Stage 3](#) guidance in mind, focus on key areas of maths that experts have identified as the most impactful for GCSE success. They come with personalised learning and next steps to allow students to develop in both knowledge and confidence.

### Rationale

We know that maths is a hierarchical subject, with knowledge being built upon foundational maths which underpins the new concept. We have analysed data from hundreds of thousands of exam questions and found that even though content is first encountered in the early stages of a learner's schooling, a significant proportion of learners answer questions on the foundations of maths incorrectly.

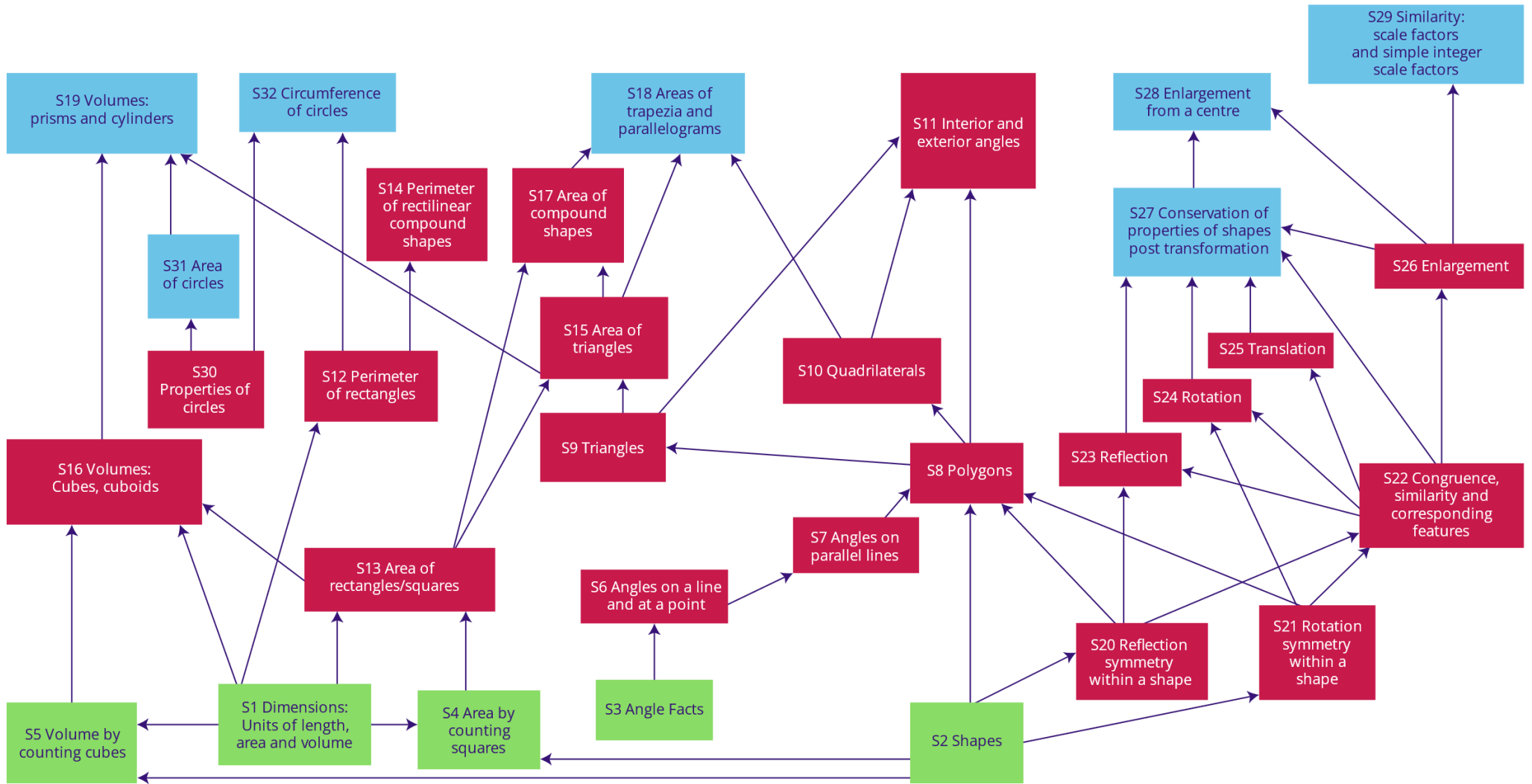
With this in mind, we want to empower teachers to take control of their classrooms and provide a nurturing environment in which gaps within key prerequisite understanding are identified and corrective instruction is deployed, filling the gaps and ensuring that more complex content can be taught, safe in the knowledge that learners have the underlying knowledge required to be successful in their lessons, and thrive in the GCSE examinations.

### Key features

The Shapes Concept Map, shown on the next page, shows the importance of S8 Polygons with a significant number of predecessors, bringing this knowledge together and progressing S9 Triangles, S10 Quadrilaterals and S11 Interior and Exterior Angles. Knowledge of the properties of quadrilaterals (S10) facilitates problem solving at GCSE.

The idea of congruence (and similarity) is key when working with the four transformations (S23, S24, S25, S26) and it's clear that learners must have significant expertise with S2 Shapes to succeed with the ideas of perimeter, area and volume which are prevalent in the Shapes knowledge space.

5. Shapes



# S1 Dimensions: units of length, volume and area

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their understanding of measures in differing numbers of dimensions, recalling common units.   |
| Learning Objectives   | <p>S1.1 Identify the units that represent length</p> <p>S1.2 Recall the definition of length</p> <p>S1.3 Identify the units that represent area</p> <p>S1.4 Identify the units that represent volume</p> <p>S1.5 Recall the definition of volume</p> <p>S1.6 Know that volume is the amount of space occupied by a 3D figure in cubic units</p>  |
| Predecessors  | None   |
| Successors  | <p>S4 Area by counting squares</p> <p>S5 Volume by counting cubes</p> <p>S12 Perimeter of rectangles</p> <p>S13 Area of rectangles/squares</p> <p>S16 Volumes: Cubes, cuboids</p>  |
| KS2 & KS3 Guidance  | Learners encounter units for length in Year 2 (page 52, KS1 and KS2 guidance), area in Year 5 (page 269, KS1 and KS2 guidance) and volume in upper KS2, extending on this knowledge in Year 8 (page 183, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 5: Measures</b></p> <p>Intervention Learning Sequences:</p> <p>5.1 Reading scales</p> <p>5.2 Converting units of measures</p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.2 Perimeters and areas of squares and rectangles</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 15, 15.1 The metric system, 15.1 Metric units of length</p> |

## S2 Shapes

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to identify common 2D shapes and 3D solids.  |
| Learning Objectives   | <p>S2.1 Identify basic 3D shapes (cube and cuboid, cone, cylinder and pyramid)</p> <p>S2.2 Categorise objects according to their dimensionality</p> <p>S2.3 Identify basic 2D shapes (circle, triangle, square etc)</p> <p>S2.4 Match polygons to their number of sides</p> |
| Predecessors  | None  |
| Successors  | <p>S4 Area by counting squares</p> <p>S5 Volume by counting cubes</p> <p>S8 Polygons</p> <p>S20 Reflection symmetry within a shape</p> <p>S21 Rotation symmetry within a shape</p>  |
| KS2 & KS3 Guidance  | Learners begin to recognise shapes and solids in Year 1 (page 42, KS1 and KS2 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 2, 2.1 Properties of 2D shapes</p> <p>Book 2: 11 11.1 Properties of 3D shapes</p>  |

## S3 Angle facts

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their ability to describe an angle as a fraction of a whole revolution.   |
| Learning Objectives   | <p>S3.1 Recall the definition of angle</p> <p>S3.2 Recall the number of degrees equivalent to a full turn</p> <p>S3.3 Recall the number of degrees equivalent to a half of a full turn</p> <p>S3.4 Recall the number of degrees equivalent to a quarter of a full turn</p> <p>S3.5 Match the terms acute, obtuse and reflex angles with their definitions (improve definitions)</p> <p>S3.6 Identify the correct notation of an angle (single correct answer, remove reverse notation)</p> |
| Predecessors  | None   |
| Successors  | S6 Angles on a line and at a point   |
| KS2 & KS3 Guidance  | Learners begin to consider angles as parts of a full turn in Year 3 (page 134, KS1 and KS2 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 8: Geometry</b></p> <p>Intervention Learning Sequence:</p> <p>8.2 Angles and triangles</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 2, 2.1 Properties of 2-D shapes</p>   |

## S4 Area by counting squares

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their understanding of area, and their ability to find areas by counting squares.   |
| Learning Objectives   | <p>S4.1 Find the area of a rectangle by counting squares</p> <p>S4.2 Find the area of a simple 2D shape by counting squares</p> <p>S4.3 Recall the definition of area</p> <p>S4.4 Find the area of a 2D shape by counting squares and half squares</p> <p>S4.5 Know that the area of a square of side 1cm is 1 square centimetre</p>           |
| Predecessors  | <p>S1 Dimensions: Units of length, area and volume</p> <p>S2 Shapes</p>  |
| Successors  | S13 Area of rectangles/squares   |
| KS2 & KS3 Guidance  | Learners begin to calculate area in Year 5 (page 269, KS1 and KS2 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.2 Perimeters and areas of squares and rectangles</p> <p>9.3 Compound shapes</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 16, 16.1 Perimeter and area (very short reminder)</p> |

## S5 Volume by counting cubes

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of volume, and their ability to find volumes by counting cubes.  |
| Learning Objectives   | <p>S5.1 Calculate volume of a cuboid by counting cubes</p> <p>S5.2 Find how many more cubes are needed to fill the cuboid</p> <p>S5.3 Find how many more cubes are needed to make a cuboid</p> <p>S5.4 Identify the volume of a cube of side 1cm</p> <p>S5.5 Find the volume of a shape made from cubes</p> |
| Predecessors  | <p>S1 Dimensions: Units of length, area and volume</p> <p>S2 Shapes</p>   |
| Successors  | S16 Volumes: Cubes, cuboids   |
| KS2 & KS3 Guidance  | Learners begin to work with volume in upper KS2, extending on this knowledge in Year 8 (page 183, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 11, 11.3 Surface area and volume of a cuboid</p>   |



## S6 Angles on a line and at a point

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their ability to recall common angle facts and apply these to calculate missing angles.   |
| Learning Objectives   | <p>S6.1 Recall how many degrees there are at a point</p> <p>S6.2 Recall that vertically opposite angles are equal</p> <p>S6.3 Recall the number of degrees on a straight line</p> <p>S6.4 Recall the definition of perpendicular</p> <p>S6.5 Calculate the size of an unknown angle at a point</p> <p>S6.6 Calculate the size of an unknown angle on a straight line</p> |
| Predecessors  | S3 Angle Facts   |
| Successors  | S7 Angles on parallel lines  |
| KS2 & KS3 Guidance  | Learners begin to recognise relationships with angles that meet at a point, and at a point on a straight line, in KS2 and build on this knowledge in Year 8 (page 195, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 8: Geometry</b></p> <p>Intervention Learning Sequences:</p> <p>8.3 More angles</p> <p>8.4 Angle rules</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 17, 17.1 Angle facts</p>   |

## S7 Angles on parallel lines

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of the relationship between angles when parallel lines are crossed by a transversal.   |
| Learning Objectives   | <p>S7.1 Recall the definition of parallel</p> <p>S7.2 Determine the value of a corresponding angle on the given diagram</p> <p>S7.3 Identify corresponding angles on parallel lines</p> <p>S7.4 Identify alternate angles on parallel lines</p> <p>S7.5 Calculate missing angles on parallel lines</p> <p>S7.6 Calculate missing angles on parallel lines with 2 transversals</p> |
| Predecessors  | S6 Angles on a line and at a point  |
| Successors  | S8 Polygons   |
| KS2 & KS3 Guidance  | Learners begin to recognise relationships with angles in parallel lines in Year 8 (page 195, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 8: Geometry</b></p> <p>Intervention Learning Sequence:</p> <p>8.4 Angle rules</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 2: Chapter 3, 3.1 Parallel lines</p>   |

## S8 Polygons

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their ability to distinguish between regular and irregular polygons.  |
| Learning Objectives   | <p>S8.1 Identify drawings of polygons</p> <p>S8.2 Identify irregular and regular polygons</p> <p>S8.3 Recall the definition of a regular polygon</p> <p>S8.4 Know the features of a polygon</p> <p>S8.5 Know that squares are regular quadrilaterals</p> <p>S8.6 Know that equilateral triangles are regular triangles</p> |
| Predecessors  | <p>S2 Shapes</p> <p>S7 Angles on parallel lines</p> <p>S20 Reflection symmetry within a shape</p> <p>S21 Rotation symmetry within a shape</p>  |
| Successors  | <p>S9 Triangles</p> <p>S10 Quadrilaterals</p> <p>S11 Interior and exterior angles</p> <p>S22 Congruence, similarity and corresponding features</p>   |
| KS2 & KS3 Guidance  | Learners begin to distinguish between regular and irregular polygons in Year 4 (page 197, KS1 and KS2 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 2: Chapter 3, 3.2 Polygons</p>   |

## S9 Triangles

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to recall common angle facts in special triangles and apply these to calculate missing angles.   |
| Learning Objectives   | <p>S9.1 Recall the sum of angles in any triangle</p> <p>S9.2 Match drawings of types of triangles and their names</p> <p>S9.3 Identify the properties of angles in equilateral triangles</p> <p>S9.4 Identify the properties of sides in isosceles triangles</p> <p>S9.5 Calculate a missing angle in a scalene triangle</p> <p>S9.6 Calculate a missing angle in an isosceles triangle</p> |
| Predecessors  | S8 Polygons   |
| Successors  | <p>S11 Interior and exterior angles</p> <p>S15 Area of triangles</p>  |
| KS2 & KS3 Guidance  | Learners begin to recognise relationships with angles in triangles in Year 8 (page 195, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 8: Geometry</b></p> <p>Intervention Learning Sequence:</p> <p>8.2 Angles and triangles</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 2, 2.1 Properties of 2-D shapes</p> <p>Book 1: Chapter 17, 17.2 Angles in a triangle</p>   |

## S10 Quadrilaterals

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to recognise special quadrilaterals and apply angle facts to calculate missing angles.   |
| Learning Objectives   | <p>S10.1 Match drawings of different quadrilaterals and their names</p> <p>S10.2 Know the equal sides properties of quadrilaterals</p> <p>S10.3 Know the parallel sides properties of quadrilaterals</p> <p>S10.4 Know the angle properties of quadrilaterals</p> <p>S10.5 Know the diagonal properties of quadrilaterals</p> |
| Predecessors  | S8 Polygons   |
| Successors  | <p>S11 Interior and exterior angles</p> <p>S18 Areas of trapezia and parallelograms</p>   |
| KS2 & KS3 Guidance  | Learners begin to appreciate the properties of special quadrilaterals in Year 8 (page 195, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 17, 17.3 Angles in a quadrilateral</p> <p>Book 2: Chapter 10, 10.1 Types of quadrilateral (also chapter starting activity on page 162)</p>   |

## S11 Interior and exterior angles

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of the relationship between interior and exterior angles in polygons, using the angle sum of polygons to calculate missing angles.   |
| Learning Objectives   | <p>S11.1 Identify interior and exterior angles</p> <p>S11.2 Recall what the sum of exterior angles of a polygon equals to</p> <p>S11.3 Know the sum of the interior and exterior angles at a vertex is 180 degrees</p> <p>S11.4 Recall the sum of the interior angles in a 3,4,5, 6 sided polygon</p> <p>S11.5 Calculate a missing exterior angle based on the interior angles of a triangle</p> <p>S11.6 Calculate a missing interior angle in a quadrilateral</p> |
| Predecessors  | <p>S8 Polygons</p> <p>S9 Triangles</p> <p>S10 Quadrilaterals</p>  |
| Successors  | None  |
| KS2 & KS3 Guidance  | Learners begin to recognise relationships with interior and exterior angles in polygons in Year 8 (page 195, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 2: Chapter 3, 3.2 Polygons</p>  |

## S12 Perimeter of rectangles

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their understanding of perimeter, using this knowledge to calculate missing lengths.  |
| Learning Objectives   | <p>S12.1 Know that the perimeter of a 2D shape is the total of the length of its sides</p> <p>S12.2 Find the perimeter of a rectangle</p> <p>S12.3 Write the formula for the perimeter of a rectangle</p> <p>S12.4 Calculate the length of one side of a rectangle when given one length and the perimeter</p> <p>S12.5 Identify the formula for the perimeter of a rectangle</p> <p>S12.6 Know that rectangles with the same area can have different perimeters</p> |
| Predecessors  | S1 Dimensions: Units of length, area and volume  |
| Successors  | <p>S14 Perimeter of rectilinear compound shapes</p> <p>S32 Circumference of circles</p>  |
| KS2 & KS3 Guidance  | Learners first encounter perimeter in Year 4 (page 197, KS1 and KS2 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.2 Perimeters and areas of squares and rectangles</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 16, 16.1 Perimeter and area</p>  |

## S13 Area of rectangles/squares

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of area, calculating the area of rectangles and squares.   |
| Learning Objectives   | <p>S13.1 Calculate the area of a rectangle using the formula length <math>\times</math> width</p> <p>S13.2 Match rectangles to their areas (both lengths given)</p> <p>S13.3 Calculate the side of a square given the area</p> <p>S13.4 Calculate the length of one side of a rectangle given the area</p> <p>S13.5 Match rectangles to their lengths (Area and one length given)</p> |
| Predecessors  | <p>S1 Dimensions: Units of length, area and volume</p> <p>S4 Area by counting squares</p>   |
| Successors  | <p>S15 Area of triangles</p> <p>S16 Volumes: Cubes, cuboids</p> <p>S17 Area of compound shapes</p>  |
| KS2 & KS3 Guidance  | Learners begin to calculate area in Year 5 (page 269, KS1 and KS2 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequences:</p> <p>9.2 Perimeters and areas of squares and rectangles</p> <p>9.3 Compound shapes</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 16, 16.1 Perimeter and area</p>   |

## S14 Perimeter of rectilinear compound shapes

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of perimeter, calculating the perimeter of compound rectilinear shapes.  |
| Learning Objectives   | <p>S14.1 Identify the missing lengths of compound shapes</p> <p>S14.2 Calculate perimeter of compound 2D shapes using the given required lengths</p> <p>S14.3 Calculate perimeter of compound 2D shapes when not all required lengths are given</p>         |
| Predecessors  | S12 Perimeter of rectangles   |
| Successors  | None  |
| KS2 & KS3 Guidance  | Learners extend their knowledge of perimeter to compound shapes in Year 6 (page 322, KS1 and KS2 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.3 Compound shapes</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 16, 16.3 Compound shapes</p> |



## S15 Area of triangles

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of area, drawing on their ability to calculate the area of rectangles and squares to calculate the area of triangles.  |
| Learning Objectives   | <p>S15.1 Know the relationship between area of a triangle and rectangle</p> <p>S15.2 Identify the height of a triangle</p> <p>S15.3 Identify the formula of the area of a triangle</p> <p>S15.4 Calculate the area of a triangle using the formula</p> <p>S15.5 Calculate the height of a triangle, given its area and base</p> |
| Predecessors  | <p>S9 Triangles</p> <p>S13 Area of rectangles/squares</p>   |
| Successors  | <p>S17 Area of compound shapes</p> <p>S18 Areas of trapezia and parallelograms</p> <p>S19 Volumes: prisms and cylinders</p>   |
| KS2 & KS3 Guidance  | Learners extend their knowledge of area to triangles in Year 6 (page 322, KS1 and KS2 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 16, 16.2 Area of a triangle</p>  |

## S16 Volumes: cubes, cuboids

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their understanding of volume, calculating the volume of cuboids and cubes.   |
| Learning Objectives   | <p>S16.1 Calculate the volume of a cuboid made of cubes</p> <p>S16.2 Calculate volume of a cube using <math>l \times l \times l</math> (unit given)</p> <p>S16.3 Calculate volume of a cuboid using <math>l \times w \times h</math></p> <p>S16.4 Calculate the length of the side of a cube, given the volume</p> <p>S16.5 Calculate the length of a missing side of a cuboid, given its volume and 2 sides</p> |
| Predecessors  | <p>S1 Dimensions: Units of length, area and volume</p> <p>S5 Volume by counting cubes</p> <p>S13 Area of rectangles/squares</p>  |
| Successors  | S19 Volumes: prisms and cylinders  |
| KS2 & KS3 Guidance  | Learners encounter volume in upper KS2, extending on this knowledge in Year 8 (page 183, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 2: Chapter 11, 11.3 Surface area and volume of a cuboid</p>  |

## S17 Area of compound shapes

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their understanding of area, drawing on their ability to calculate the area of rectangles, squares and triangles to calculate the area of compound shapes.  |
| Learning Objectives   | <p>S17.1 Identify divisions of a compound shape that can be used to calculate its area</p> <p>S17.2 Calculate the area of a compound shape (rectangle + rectangle)</p> <p>S17.3 Calculate the area of a compound shape (rectangle + triangle)</p> <p>S17.4 Calculate the area of a 2D compound shape by splitting the area and adding the parts (rectangle + triangle)</p> |
| Predecessors  | <p>S13 Area of rectangles/squares</p> <p>S15 Area of triangles</p>   |
| Successors  | S18 Areas of trapezia and parallelograms   |
| KS2 & KS3 Guidance  | Learners extend their knowledge of area to compound shapes in Year 6 (page 322, KS1 and KS2 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.3 Compound shapes</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 16, 16.3 Compound shapes</p>  |

## S18 Areas of trapezia and parallelograms

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of area, drawing on their ability to calculate the area of rectangles to calculate the area of parallelograms and trapezia.  |
| Learning Objectives   | <p>S18.1 Identify the height of a parallelogram</p> <p>S18.2 Identify the height of a trapezium</p> <p>S18.3 Identify the formula of the area of a parallelogram</p> <p>S18.4 Calculate the area of a parallelogram using the formula</p> <p>S18.5 Identify the formula of the area of a trapezium</p> <p>S18.6 Calculate area of a trapezium using the formula</p> |
| Predecessors  | <p>S10 Quadrilaterals</p> <p>S15 Area of triangles</p> <p>S17 Area of compound shapes</p>   |
| Successors  | None  |
| KS2 & KS3 Guidance  | Learners begin to calculate the area of parallelograms in KS2, extending their knowledge to trapezia in Year 7 (page 73, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 2: Chapter 10, 10.2 Area</p>  |

## S19 Volumes: prisms and cylinders

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their understanding of volume, drawing on their understanding of the properties of prisms to calculate the volume of prisms and cylinders.  |
| Learning Objectives   | <p>S19.1 Identify prisms</p> <p>S19.2 Know the properties of prisms</p> <p>S19.3 Calculate volume of a simple prism (given cross-sectional area)</p> <p>S19.4 Calculate the length of a prism, given its volume and base area</p> <p>S19.5 Identify the formula for the volume of a cylinder</p> <p>S19.6 Calculate volume of a cylinder</p> |
| Predecessors  | <p>S15 Area of triangles</p> <p>S16 Volumes: Cubes, cuboids</p> <p>S31 Area of circles</p>   |
| Successors  | None   |
| KS2 & KS3 Guidance  | Learners extend their knowledge of volume to prisms and cylinders in Year 8 (page 183, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 3: Chapter 11, 11.1 Volume of a prism, 11.2 Volume of a cylinder</p>   |

## S20 Reflection symmetry within a shape

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of reflection symmetry.  |
| Learning Objectives   | <p>S20.1 Categorise the properties of lines of symmetry in shapes</p> <p>S20.2 Match shapes with their number of lines of symmetry</p> <p>S20.3 Recall the definition of line symmetry</p> <p>S20.4 Know the line symmetry properties of triangles</p> <p>S20.5 Know the line symmetry properties of quadrilaterals</p> |
| Predecessors  | S2 Shapes   |
| Successors  | <p>S8 Polygons</p> <p>S22 Congruence, similarity and corresponding features</p> <p>S23 Reflection</p>   |
| KS2 & KS3 Guidance  | Learners begin to appreciate reflection symmetry in Year 4 (page 201, KS1 and KS2 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequences:</p> <p>9.1 Lines of symmetry in 2D shapes</p> <p>9.4 Symmetry and transformations</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 2, 2.2 line symmetry</p>         |

## S21 Rotation symmetry within a shape

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of rotational symmetry.  |
| Learning Objectives   | <p>S21.1 Identify order of rotational symmetry of a given shape</p> <p>S21.2 Know the rotational symmetry properties of quadrilaterals</p> <p>S21.3 Know the rotational symmetry properties of triangles</p> <p>S21.4 Recall the definition of rotational symmetry</p> <p>S21.5 Know a regular polygon has rotational symmetry equal to its number of sides</p> <p>S21.6 Know that the lowest order of rotational symmetry is 1</p> |
| Predecessors  | S2 Shapes   |
| Successors  | <p>S8 Polygons</p> <p>S22 Congruence, similarity and corresponding features</p> <p>S24 Rotation</p>   |
| KS2 & KS3 Guidance  | Learners encounter rotational symmetry in Year 9 (page 214, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.4 Symmetry and transformations</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 2, 2.3 Rotational symmetry<br/>Chapter 10, 10.1 types of quadrilateral</p>  |

## S22 Congruence, similarity and corresponding features

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their understanding of congruence and similarity.   |
| Learning Objectives   | <p>S22.1 Recall the definition of transformation</p> <p>S22.2 Categorise characteristics of congruent shapes</p> <p>S22.3 Define similar shapes</p> <p>S22.4 Identify corresponding sides and angles</p> <p>S22.5 Identify shapes that are congruent</p> <p>S22.6 Identify similar shapes</p>      |
| Predecessors  | S21 Rotation symmetry within a shape   |
| Successors  | <p>S23 Reflection</p> <p>S24 Rotation</p> <p>S25 Translation</p> <p>S26 Enlargement</p> <p>S27 Conservation of properties of shapes post transformation</p>  |
| KS2 & KS3 Guidance  | Learners begin to appreciate congruence and similarity in Year 9 (page 214, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 3: 3.2 Translations, 3.3 Reflections and rotations</p> <p>Book 3: Chapter 10<br/>           Chapter 12, 12.3 Congruent triangles<br/>           Chapter 13, 13.1 Similarity</p> |

## S23 Reflection

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to apply reflection as a transformation, drawing on their understanding of reflection symmetry.  |
| Learning Objectives   | <p>S23.1 Identify the line of reflection when a shape is reflected</p> <p>S23.2 Identify the image of a shape when transformed by a reflection</p> <p>S23.3 Know that a reflection needs a mirror line</p> <p>S23.4 Know that a reflection changes a shape's sense</p> <p>S23.5 Reflect a simple 2D shape in a mirror line</p> <p>S23.6 Identify the equation of the line of reflection of a given shape and its reflected image</p> <p>S23.7 Draw the image of a shape when it is transformed by a reflection around <math>y = x</math> line</p> <p>S23.8 Draw the image of a shape when it is transformed by a reflection around a specified line</p> |
| Predecessors  | <p>S20 Reflection symmetry within a shape</p> <p>S22 Congruence, similarity and corresponding features</p>  |
| Successors  | S27 Conservation of properties of shapes post transformation  |
| KS2 & KS3 Guidance  | Learners begin to appreciate reflection symmetry in Year 4 (page 201, KS1 and KS2 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.4 Symmetry and transformations</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 3: 3.3 Reflections and rotations</p> <p>Book 3: Chapter 10 10.1 Reflection and translation</p>  |

## S24 Rotation

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to apply rotation as a transformation, drawing on their understanding of rotational symmetry.  |
| Learning Objectives   | <p>S24.1 Identify an anticlockwise direction</p> <p>S24.2 Identify a clockwise direction</p> <p>S24.3 Recognise different angles of rotation</p> <p>S24.4 Identify the image of a shape when it is transformed by a rotation</p> <p>S24.5 Identify the image of a shape when rotated around the origin</p> <p>S24.6 Know that a rotation needs a centre and an angle</p> <p>S24.7 Know that a rotation changes orientation and not sense</p> <p>S24.8 Identify the image of a shape when rotated around a specified centre of rotation in co-ordinate format</p> <p>S24.9 Find a centre of rotation</p> |
| Predecessors  | <p>S21 Rotation symmetry within a shape</p> <p>S22 Congruence, similarity and corresponding features</p>  |
| Successors  | S27 Conservation of properties of shapes post transformation  |
| KS2 & KS3 Guidance  | Learners encounter the idea of rotation in KS2 and extend this idea in Year 7 (page 112, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 3: 3.3 Reflections and rotations</p> <p>Book 3: Chapter 10 10.1 Reflection and translation</p>   |

## S25 Translation

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to apply translation as a transformation.  |
| Learning Objectives   | <p>S25.1 Identify a translated shape from its description</p> <p>S25.2 Know that a translation preserves a shape's orientation and sense</p> <p>S25.3 Know which is the original shape and which is the image in a translation</p> <p>S25.4 Know that a translation needs horizontal and vertical components</p> <p>S25.5 Describe a translation from a diagram</p> |
| Predecessors  | S22 Congruence, similarity and corresponding features   |
| Successors  | S27 Conservation of properties of shapes post transformation  |
| KS2 & KS3 Guidance  | Learners encounter the idea of translation in KS2 and extend this idea in Year 7 (page 112, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 3: 3.2 Translations</p> <p>Book 3: Chapter 10 10.1 Reflection and translation</p>  |

## S26 Enlargement

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their ability to apply enlargement as a transformation, drawing on their understanding of similar shapes.   |
| Learning Objectives   | <p>S26.1 Identify the image of a shape when it is transformed by an enlargement</p> <p>S26.2 Identify the scale factor of enlargement of two similar shapes</p> <p>S26.3 Enlarge a shape on a grid by a simple integer scale factor</p> <p>S26.4 Enlarge a shape on a grid by a simple fractional scale factor</p> |
| Predecessors  | S22 Congruence, similarity and corresponding features  |
| Successors  | <p>S27 Conservation of properties of shapes post transformation</p> <p>S28 Enlargement from a centre</p> <p>S29 Similarity: scale factors and simple integer scale factors</p>   |
| KS2 & KS3 Guidance  | Learners encounter the idea of enlargement in KS2 and extend this idea in Year 7 (page 112, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 3: Chapter 10 10.3 Enlargement</p>   |

## S27 Conservation of properties of shapes post transformation

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their understanding of transformations, drawing on their understanding of congruence and similarity.   |
| Learning Objectives   | <p>S27.1 Identify the transformations that preserve the properties of congruence</p> <p>S27.2 Recognise that enlarging a shape does not change the size of angles but changes the length of the sides</p> <p>S27.3 Match types of transformation with their descriptions</p> <p>S27.4 Match transformations to their diagrams</p> |
| Predecessors  | <p>S22 Congruence, similarity and corresponding features</p> <p>S23 Reflection</p> <p>S24 Rotation</p> <p>S25 Translation</p> <p>S26 Enlargement</p>  |
| Successors  | S28 Enlargement from a centre   |
| KS2 & KS3 Guidance  | Learners begin to appreciate the four transformations in KS2 and extend this knowledge in Year 7 (page 112, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 3 3.2 Translations, 3.3 Reflections and rotations</p> <p>Book 3: Chapter 10 Transformations</p>  |

## S28 Enlargement from a centre

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to apply enlargement as a transformation, applying this knowledge to enlargements from different centres.  |
| Learning Objectives   | <p>S28.1 Describe the properties (scale factor and centre of enlargement) when given two similar shapes</p> <p>S28.2 Know that an enlargement needs a centre and a scale factor</p> <p>S28.3 Identify the centre of enlargement given two similar shapes</p> <p>S28.4 Enlarge a shape on a grid by a simple positive integer scale factor given the centre of enlargement</p> |
| Predecessors  | <p>S26 Enlargement</p> <p>S27 Conservation of properties of shapes post transformation</p>  |
| Successors  | S29 Similarity: scale factors and simple integer scale factors  |
| KS2 & KS3 Guidance  | Learners begin to appreciate the centre of enlargement in Year 7 (page 115, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 3: Chapter 10 10.3 Enlargement</p>  |

## S29 Similarity: Scale factors and simple integer scale factors

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to apply their knowledge of similarity.  |
| Learning Objectives   | <p>S29.1 Recall that corresponding lengths in similar shapes are in the same ratio</p> <p>S29.2 Recognise how to calculate the scale factor that links two similar shapes</p> <p>S29.3 Calculate the scale factor that links two similar shapes</p> <p>S29.4 Calculate missing lengths in similar shapes using a scale factor</p> |
| Predecessors  | <p>S26 Enlargement</p> <p>S28 Enlargement from a centre</p>   |
| Successors  | None  |
| KS2 & KS3 Guidance  | Learners explore scale factors in KS2 and extend on this idea in Year 7 (page 112, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><i>No appropriate Shine Intervention</i></p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 3: Chapter 10 10.3 Enlargement<br/>Chapter 13 13.1 Similarity</p>   |

## S30 Properties of circles

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their understanding of the properties of a circle.  |
| Learning Objectives   | <p>S30.1 Match diameter, radius, circumference with their graphical representations</p> <p>S30.2 Know the relationship between radius and diameter</p> <p>S30.3 Recognise the calculation to find the radius from the diameter</p> <p>S30.4 Define the relationship between circumference and diameter of a circle</p> |
| Predecessors  | None   |
| Successors  | <p>S31 Area of circles</p> <p>S32 Circumference of circles</p>   |
| KS2 & KS3 Guidance  | Learners begin to explore the properties of circles in Year 8 (page 183, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.5 Circles</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 1: Chapter 2, 2.1 Properties of 2D shapes</p> <p>Book 2: Chapter 15, 15.1 Circumference</p>                |

## S31 Area of circles

|   |  |
|---|--|
| What is being tested  | Learners are being tested on their ability to calculate the area of circles.   |
| Learning Objectives   | <p>S31.1 Calculate area of a circle with given radius using <math>\pi</math> given as 3.14</p> <p>S31.2 Identify the formula to calculate the area of a circle</p> <p>S31.3 Calculate the radius of a circle, given the area</p> <p>S31.4 Recognise how to calculate a diameter from an area</p> |
| Predecessors  | S30 Properties of circles  |
| Successors  | S19 Volumes: prisms and cylinders  |
| KS2 & KS3 Guidance  | Learners extend upon their knowledge of area, calculating the area of circles in Year 8 (page 189, KS3 guidance).  |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.5 Circles</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 2: Chapter 15, 15.2 Area of a circle</p>   |



## S32 Circumference of circles

|   |   |
|---|---|
| What is being tested  | Learners are being tested on their ability to calculate the circumference of circles.   |
| Learning Objectives   | <p>S32.1 Identify the calculation for circumference with a given radius</p> <p>S32.2 Identify the formula to calculate the circumference of a circle</p> <p>S32.3 Identify the calculation for approx diameter of a circle with given circumference</p> <p>S32.4 Calculate circumference of a circle with given diameter using <math>\pi</math> given as 3.14</p> |
| Predecessors  | <p>S12 Perimeter of rectangles</p> <p>S30 Properties of circles</p>   |
| Successors  | None  |
| KS2 & KS3 Guidance  | Learners extend their knowledge of perimeter to include the circumference of a circle in Year 8 (page 185, KS3 guidance).   |
| Hachette Learning (formerly Hodder Education) Platform References | <p><b>Shine Interventions: Access Mathematics Tests</b></p> <p><b>Strand 9: Shape</b></p> <p>Intervention Learning Sequence:</p> <p>9.5 Circles</p> <p><b>Key Stage 3 Mastering Mathematics</b></p> <p>Book 2: Chapter 15, 15.1 Circumference</p>   |

## Contributors

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