# Angles and Scale Drawings

| Topic | Description | Application |
|---|---|---|
| Scale Drawings | Draw and measure line segments and angles in geometric figures, including interpreting scale drawings. Use proportionality and unit conversions. | Engineering construction and architectural design examples |
| Bearings | Measure and draw bearings. Understand that bearings must be three digits and why it is measured clockwise from North. Include scale drawings in context. | Plane run ways and navigation. Ship navigation |
| Angles in Parallel Lines | Identify angles on parallel lines and their associated rules- Alternate, Corresponding, Allied and Alternate exterior. Include all previous angle rules and algebra. | Engineering construction and design examples |
| Interior/Exterior Angles in Polygons | Calculate interior and exterior angles in any polygon. Include angle problems with compound shapes and algebra. | Product/graphic design |
| Star Project          1-2 Lessons | Using a compass, protractor and ruler (Construction skills) Factors Labelling parts of a circle          Identifying angles | Extension – Finding area and circumference |

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| Return Bearings | Calculate return bearings and more complex problems through use of parallel line rules. | Plane run ways and navigation. Ship navigation |
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| Key Knowledge/Prior Learning KS2/3 and Retrieval and Suggested Starters |
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| • Calculations<br>• Substitution<br>• Measuring lines<br>• Drawing angles<br>• Unit conversions |

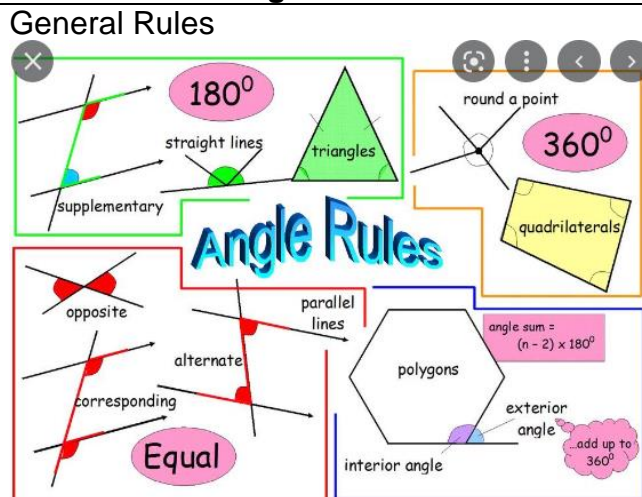| KS3 National Curriculum – what students will be practicing and Key Questions |
|---|
| • Draw and measure line segments and angles including bearings.<br><br>• Identify angles within parallel lines and use correct mathematical terminology. Apply these skills to deduce size of different angles,<br><br>• Calculate interior and exterior angles of a polygon.<br><br>• Combine skills of parallel lines and bearings to find return bearings and solve more complex problems. |

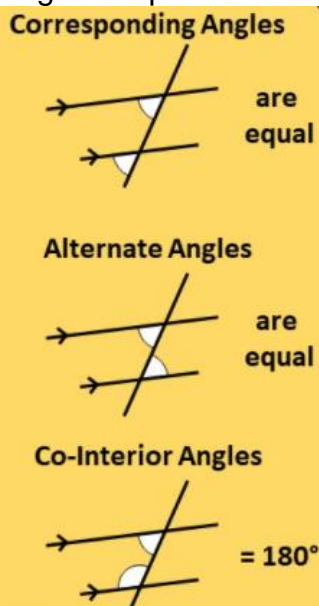| Specific Ambitious Knowledge |
|---|
| <br>• Interior angles and sum of interior methods:<br><br>   Exterior angles method<br>   Triangles from the vertices<br>   Triangles from the centre<br>   Triangles from an interior point |

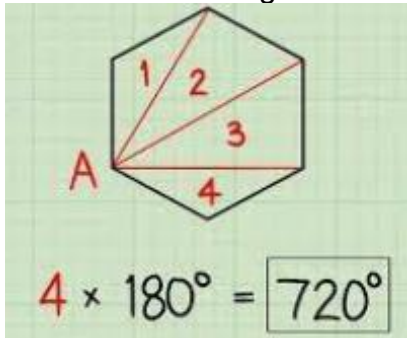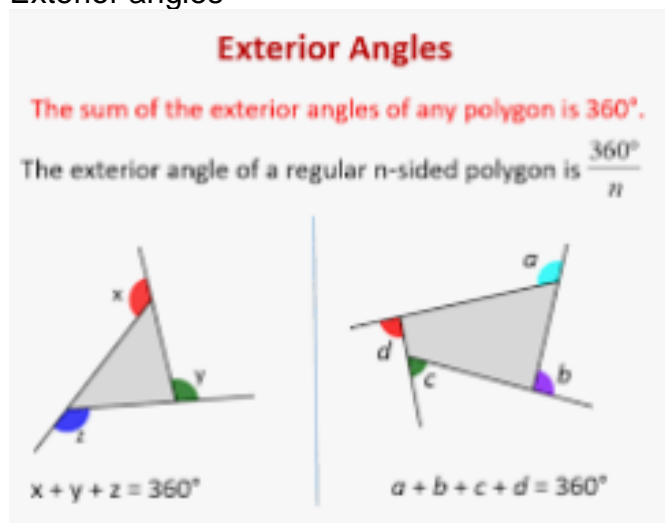| Key Vocabulary/Literacy Opportunities |
| --- |
| <ul><li>Polygon</li><li>Parallel</li><li>Corresponding</li><li>Alternate</li><li>Co-interior</li><li>Bearing/return bearing</li><li>Interior/Exterior</li><li>Angle</li><li>North</li><li>Compass</li><li>Navigate</li></ul> |

| Key Formulae/Knowledge |
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| General Rules  Angles on parallel lines  |

Sum of interior angles



$4 \times 180° = \boxed{720°}$

Exterior angles



**Exterior Angles**

The sum of the exterior angles of any polygon is 360°.

The exterior angle of a regular n-sided polygon is $\dfrac{360°}{n}$

$x + y + z = 360°$

$a + b + c + d = 360°$
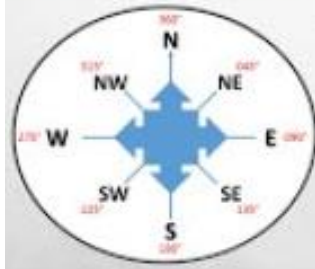
Interior and exterior angles add to 180.



*Exterior Angle*
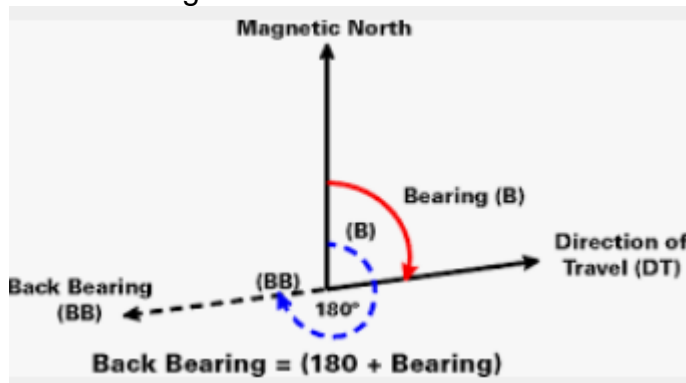115°

180°

*Interior Angle*
65°
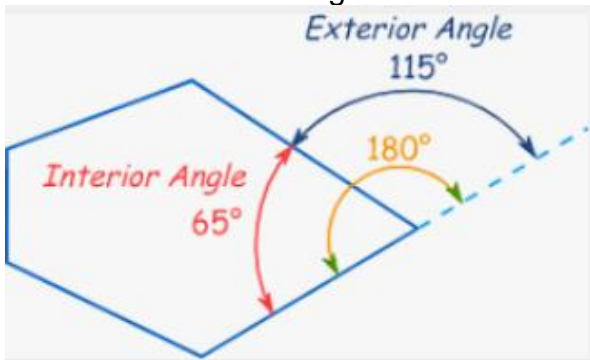
Bearings

## WHAT IS A BEARING?

- A bearing is a measurement of direction between two points.
- It is given as the angle measured clockwise from north.
- Bearings are normally given as three digits so bearings less than 100° contain leading zeros.

Back Bearings



Back Bearing = (180 + Bearing)

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### Maths in Context (Historical, Real Life and Student Thinking Points)

Orienteering

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### Projects/Enrichment/Investigations

- Map Investigations
- Orienteering tasks

Project for all:
Star project – Includes using a compass, protractor and ruler, factors, labelling parts of a circle and identifying angles. Can be extended to find area and circumference.