Year 9 Mathematics Learning Journey: Unit 6 - Angles in Parallel Lines and Polygons

Step 1 (R): Basic angle rules and notation
What is the difference between an obtuse and an acute angle?

Step 2: Angles between parallel lines
How do you know when two or more lines are parallel?

Step 3: Alternate and corresponding angles
How do you identify a pair of corresponding angles?

Step 4: Calculating with co-interior angles
Can you have co-interior angles in a pair of lines which are not parallel?

Step 6 (R): Triangles and quadrilaterals
How is a rhombus different from a parallelogram?

Step 7: Properties of quadrilaterals
"All rectangles are squares". Comment on the statement above.

Step 8: Calculate sides and angles
What makes a trapezium an isosceles trapezium?

Step 9 (H): Diagonals of quadrilaterals
Is it possible for a diagonal to be outside the shape?

Step 10: Sum of exterior angles
If a polygon is regular, what is the size of each external angle?

Step 11: Sum of interior angles in polygons
Is it possible to have a reflex interior angle in a polygon?

Step 12: Missing angles in regular polygons
Explain why neither a rectangle nor a rhombus are regular polygons.

Step 13 (H): Prove geometric facts
What is the difference between a proof and a demonstration?

Achievement resilience Community PERSEVERANCE Pride

SHUTTLEWORTH COLLEGE

Angles in Parallel Lines and Polygons - Career Links

- **Mechanical engineers** - Use geometry to design mechanical devices, or update existing structures. They can create anything from elevators and escalators to transfer systems or air conditioners.

- **Carpenters** - Need to understand geometric concepts. From pouring concrete into tubes, which requires an understanding of how to calculate the volume, to building floors which requires an understanding of parallel lines and area, carpenters are required to have a more than average understanding of the concepts of geometry.

Achievement resilience PERSEVERANCE Community Pride

Title: Angles in Parallel Lines and Polygons

Day Date Month Year

Learning intentions:

- ❑ to understand and use basic angles rules and notation (Review Step)
- ❑ to investigate angles between parallel lines and the transversal
- ❑ to identify and calculate with alternate and corresponding angles
- ❑ to identify and calculate co-interior, alternate and corresponding angles
- ❑ to solve complex problems with parallel line angles
- ❑ to construct triangles and special quadrilaterals (Review Step)
- ❑ to investigate the properties of special quadrilaterals
- ❑ to identify and calculate with sides and angles in special quadrilaterals
- ❑ ***to understand and use the properties of diagonals of quadrilaterals***
- ❑ to understand and use the sum of exterior angles of any polygon
- ❑ to calculate and use the sum of the interior angles in any polygon
- ❑ to calculate missing interior angles in regular polygons
- ❑ ***to prove simple geometric facts***

Key Vocabulary

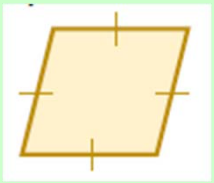
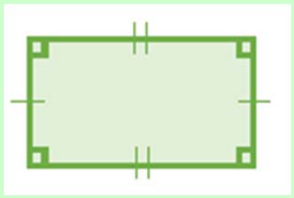
angle (n)
reflex (adj)
acute (adj)
obtuse (adj)
parallel (adj)
perpendicular (adj)
transversal (adj)
alternate (adj)
corresponding (adj)
co-interior / allied (adj)
isosceles (adj)
quadrilateral (n)
bisect (v)
exterior / interior (adj)
regular (adj)
polygon (n)

Think BIG CHASE Dreams SUCCEED TOGETHER

Year 9 Prior Knowledge Quiz: Unit 6 – Angles in Parallel Lines and Polygons

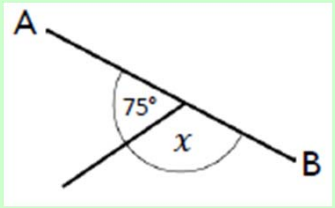
1. What type of angle is shown in each of the following diagrams?

2. Write down the mathematical name of each shape.

3. In your books, use ruler and compasses to construct an equilateral triangle with sides of length 6cm. You must show all your construction lines.

4. AB is a straight line. Work out the value of the angle labelled *x*. Give a reason for your answer.

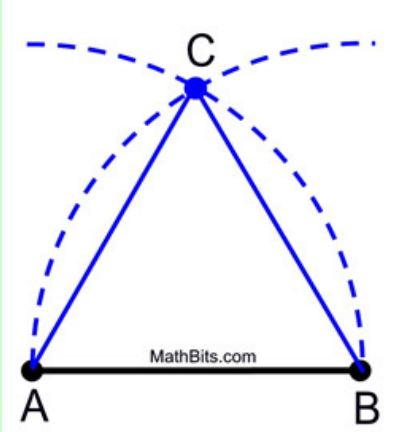


5. A triangle has the following three angles: *a, 2a* and *3a*. Form and solve an equation to find the size of the **largest** angle in the triangle.

6. What is the size of each angle in a regular hexagon?

Year 9 Prior Knowledge Quiz: Unit 6 – Angles in Parallel Lines and Polygons - ANSWERS

1. a) Obtuse b) Acute c) Reflex
2. a) Rhombus b) Rectangle c) Trapezium d) Heptagon
3. Construction lines.



4. $180 - 75 = 105^0$. $x = 105^0$ because angles on a straight line add up to 180^0
5. $a + 2a + 3a = 180$

   $6a = 180$

   $a = 30^0$

   Largest angle ($3a$) = 90^0
6. Hexagon = 6 sides Interior angles = $(6 - 2) \times 180$ $= 720^0$ $720 \div 6 = 120^0$