

WA5MMGTW1

Two-dimensional space and structures

Core + Challenge

NAPLAN-style

Rotational Symmetry

I can find the order of rotational symmetry of a shape and make patterns that turn onto themselves.

Name: _____ Date: _____ Score: _____ / 56

Key idea

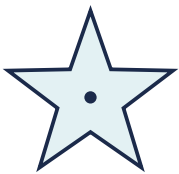
A shape has **rotational symmetry** if it looks exactly the same **before a full turn** is finished, when you turn it about its centre.

The **order** is how many times it fits onto itself in **one full turn**. Count the full turn, but only once.

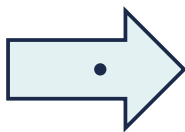
A shape that only fits after a full turn has order **1**: it has **no** rotational symmetry. Tracing paper helps you check.

Example: the star fits onto itself 5 times in a full turn, so its order is **5**. The arrow has order 1.

Order 5



Order 1 (no rotational symmetry)



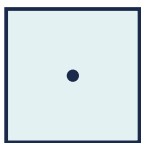
A

Warm up turn, shade and complete

/ 16 marks

Write the **order** of rotational symmetry of each shape. The dot is the centre. 1 mark each.

1 Order: _____



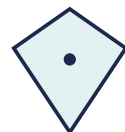
2 Order: _____



3 Order: _____



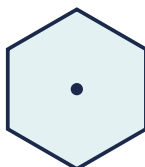
4 Order: _____



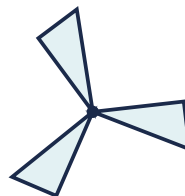
5 Order: _____



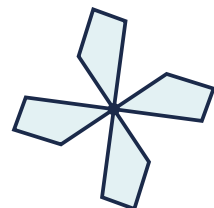
6 Order: _____



7 Order: _____



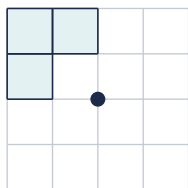
8 Order: _____



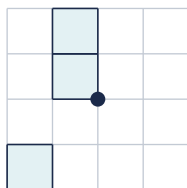
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Shade the **fewest** squares so the pattern looks the same after the turn about the dot. 1 mark each.

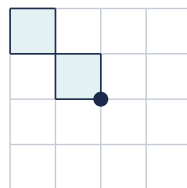
9 Half turn



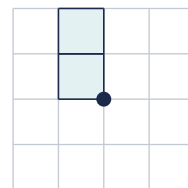
10 Half turn



11 Quarter turn

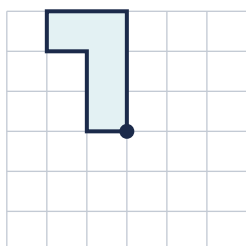


12 Quarter turn

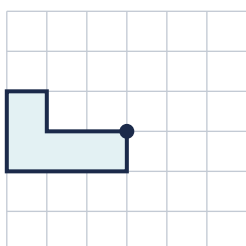


Complete each shape so it has rotational symmetry about the dot. 1 mark each.

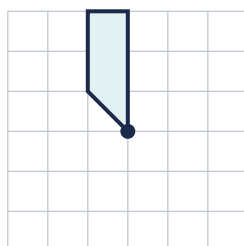
13 Order 2



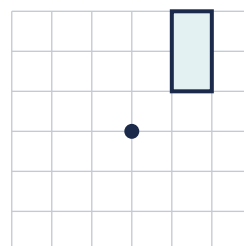
14 Order 2



15 Order 4



16 Order 4



B Practise use the skill

/ 21 marks

1 Circle the capital letters that look **exactly the same** after a **half turn**.

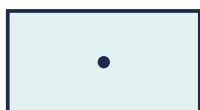
[2 marks]



2 Complete the table for shapes A to E.

[3 marks]

A



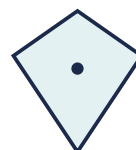
B



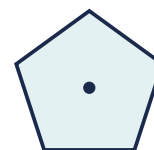
C



D



E



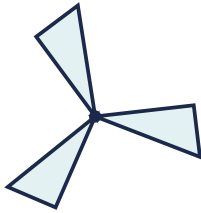
Shape	A	B	C	D	E
Lines of symmetry					
Order of rotational symmetry					

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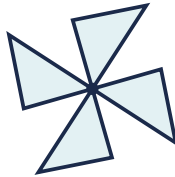
- 3 These are logos for four Perth sports clubs. Write the **order** of rotational symmetry of each logo.

[3 marks]

A



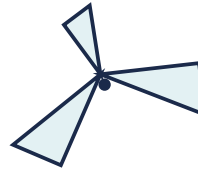
B



C



D



A

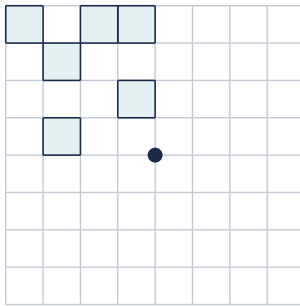
B

C

D

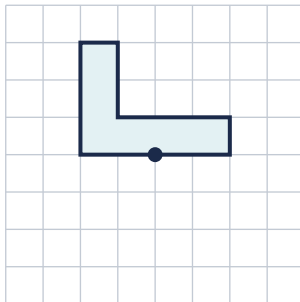
- 4 This is a floor pattern for the school hall. Shade the **fewest** squares so the pattern has rotational symmetry of **order 4** about the dot.

[3 marks]



- 5 Complete the shape so it has rotational symmetry of **order 2** about the dot. Does your finished shape have any **lines** of symmetry?

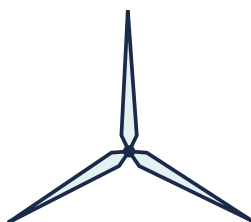
[3 marks]



Answer:

- 6 The blades of a wind turbine at the Albany Wind Farm are all the same. **a)** What is the order of rotational symmetry of the blades? **b)** What is the **smallest** turn that makes them look the same?

[2 marks]



a)

b)

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- 7 Which shape has rotational symmetry of **order 2** but **no** lines of symmetry? Circle the letter. [1 mark]

A



B



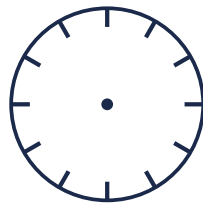
C



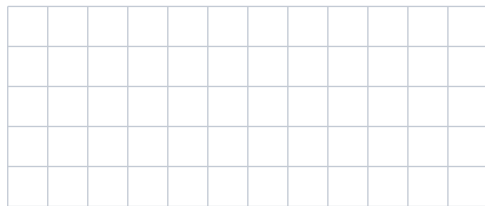
D



- 8 a) What is the order of rotational symmetry of the clock face with numbers? b) What about the dial with **12 equal marks** and no numbers? Explain. [2 marks]



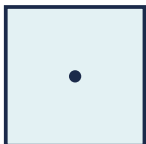
- 9 Draw a shape on the grid that has rotational symmetry of **order 2** and **no** lines of symmetry. [2 marks]



C Think it through *explain your thinking*

/ 10 marks

- 1 Mia turns a square tile. She says, "It looks the same after a quarter turn, a half turn and a three-quarter turn, so its order is **3**." Do you agree with Mia? Explain. [2 marks]



- 2 **True or false?** "A shape with **exactly 2** lines of symmetry has rotational symmetry of order 2." Draw or name examples. [2 marks]

- 3 **Always, sometimes or never true?** “A shape that has rotational symmetry also has a line of symmetry.” Circle one and give examples. [2 marks]

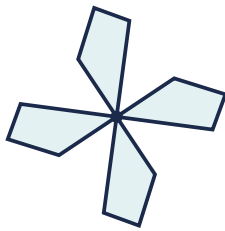
Always

Sometimes

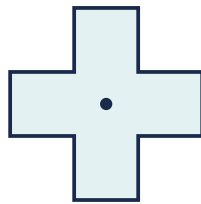
Never

- 4 Which figure is the **odd one out**? Explain. [2 marks]

A



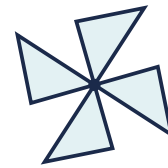
B



C



D



- 5 Sort these into the table: square, kite, parallelogram, rectangle, isosceles triangle, scalene triangle, regular hexagon, letter Z. [2 marks]

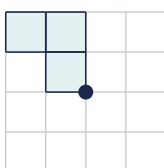
	Rotational symmetry (order 2+)	Order 1
Has a line of symmetry		
No line of symmetry		

D Challenge *stretch yourself*

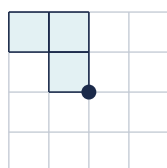
/ 9 marks

- 1 Both grids start with the same pattern. **a)** On grid a), shade the fewest squares to make rotational symmetry of **order 4** about the dot. **b)** On grid b), shade the fewest squares to make **order 2**. **c)** How many more squares did a) need than b)? Explain why. [3 marks]

a)

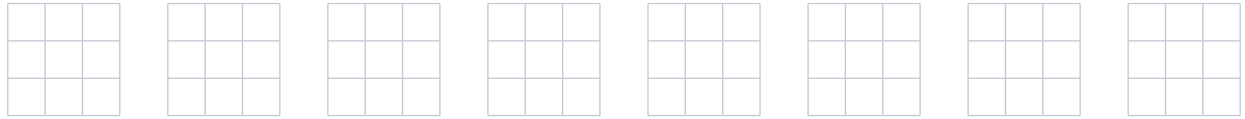


b)

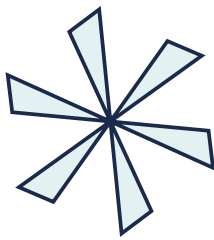


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- 2 Find all the possibilities. Shade 2 squares on a 3 by 3 grid so the pattern looks the same after a **half turn** about the centre of the grid. How many different ways are there? (A pattern that is a turn of another one counts as different.) Then explain why any such pattern with 3 shaded squares must use the middle square. [3 marks]



- 3 The Sunset Coast Surf Club logo has 6 identical blades. **a)** What is the **smallest** turn that makes it look the same? **b)** Which of these turns also make it look the same: 90° , 120° , 150° , 180° , 240° , 300° ? **c)** Another logo has order 4. What is its smallest turn? [3 marks]

**How did I go?**

Warm up ___ / 16 Practise ___ / 21 Think it through ___ / 10 Challenge ___ / 9 **Total ___ / 56**

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