

Reasoning and Problem Solving

Step 1: Measure Perimeter

National Curriculum Objectives:

Mathematics Year 5: (5M7a) [Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Combine 2D shapes to create a compound shape and calculate the perimeter. Two shapes provided; includes whole unit lengths, no conversion of units.

Expected Combine 2D shapes to create 2 compound shapes and calculate the perimeter. Three shapes provided; includes half unit lengths, no conversion of units.

Greater Depth Combine 2D shapes to create 2 compound shapes and calculate the perimeter. Four shapes provided; includes half and quarter unit lengths with some conversions.

Questions 2, 5 and 8 (Reasoning)

Developing Find the missing lengths and perimeter of simple rectilinear shapes (whole unit lengths with no conversion of units).

Expected Find the missing lengths and perimeter of compound rectilinear shapes (including some half unit lengths with no conversion of units).

Greater Depth Find the missing lengths and perimeter of compound rectilinear shapes (including any length with some conversion of units).

Questions 3, 6 and 9 (Problem Solving)

Developing Prove if the stated perimeter of a shape with a given modification (whole unit lengths with no conversion of units) is correct or not.

Expected Prove if the stated perimeter of a shape with a given modification (including some half unit lengths with no conversion of units) is correct or not.

Greater Depth Prove if the stated perimeter of a shape with a given modification (including any length with some conversion of units) is correct or not.

[More resources](#) which follow the same small steps as White Rose.

Did you like this resource? Don't forget to [review](#) it on our website.

Measure Perimeter

1a. Use the shapes below to create a compound rectilinear shape.



What is the perimeter of the shape?

Is it the same as your neighbour's?

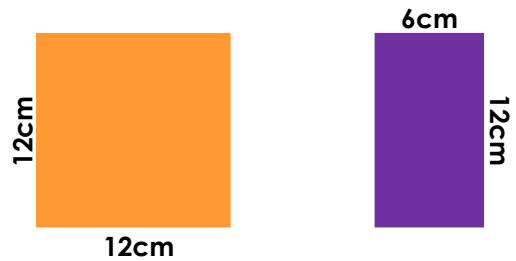


Not to scale

PS

Measure Perimeter

1b. Use the shapes below to create a compound rectilinear shape.



What is the perimeter of the shape?

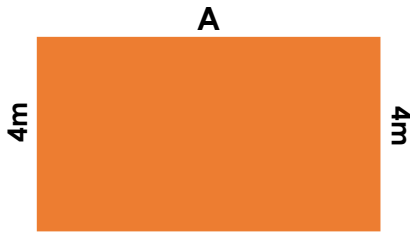
Is it the same as your neighbour's?



Not to scale

PS

2a. The perimeter of this shape is 18m.



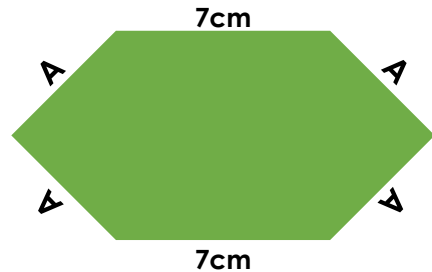
What is the possible length of the side marked A? Prove it.



Not to scale

R

2b. The perimeter of this shape is 26cm.



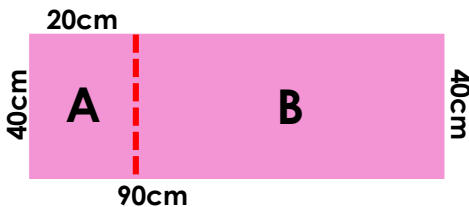
What is the possible length of the side marked A? Prove it.



Not to scale

R

3a. Theo cuts along the dotted line. He thinks the new perimeters are:
A = 120cm and B = 220cm.



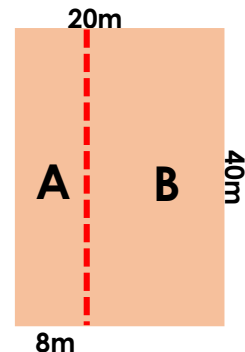
Is Theo correct? Prove it.



Not to scale

R

3b. Annis cuts along the dotted line. She thinks the new perimeters are:
A = 94m and 104m.



Is Annis correct? Prove it.

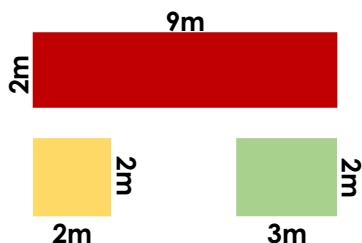


Not to scale

R

Measure Perimeter

4a. Use the shapes below to create a compound rectilinear shape.



Calculate the perimeter of your shape.

Now use the same shapes to create a compound rectilinear shape with a shorter perimeter.

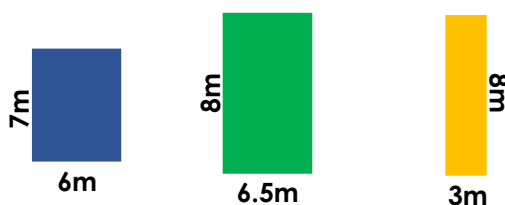


Not to scale

PS

Measure Perimeter

4b. Use the shapes below to create a compound rectilinear shape.



Calculate the perimeter of your shape.

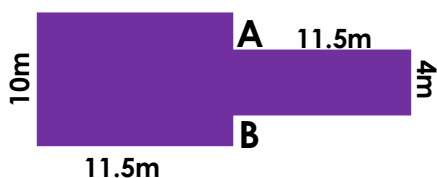
Now use the same shapes to create a compound rectilinear shape with a longer perimeter.



Not to scale

PS

5a. The perimeter of this shape is 64m.



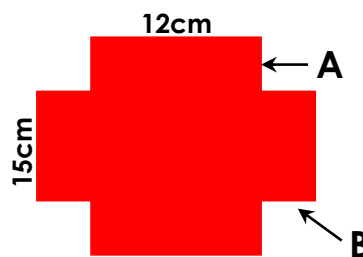
What are the possible lengths for side A and for side B? Prove it.



Not to scale

R

5b. The perimeter of this shape is 98cm.



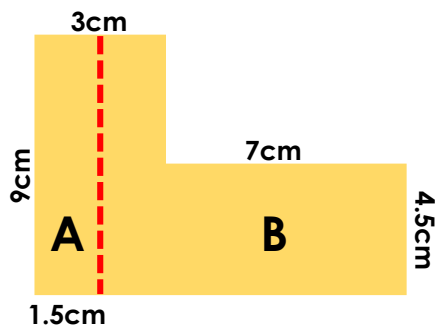
What are the possible lengths for side A and for side B? Prove it.



Not to scale

R

6a. Orla cuts along the dotted line. She thinks the new perimeters are: A = 22cm and B = 36cm.



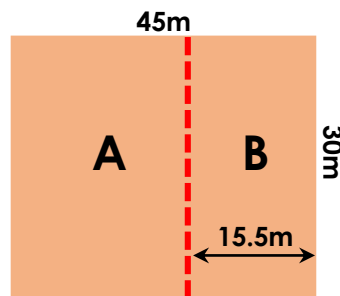
Is Orla correct? Prove it.



Not to scale

R

6b. Ronnie cuts along the dotted line. He thinks the new perimeters are: A = 119m and B = 91m.



Is Ronnie correct? Prove it.

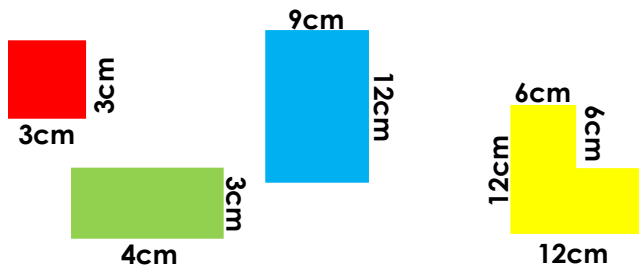


Not to scale

R

Measure Perimeter

7a. Use the shapes below to create a compound rectilinear shape.



Calculate the perimeter of your shape.

Now use the same shapes to create a compound rectilinear shape with a longer perimeter.

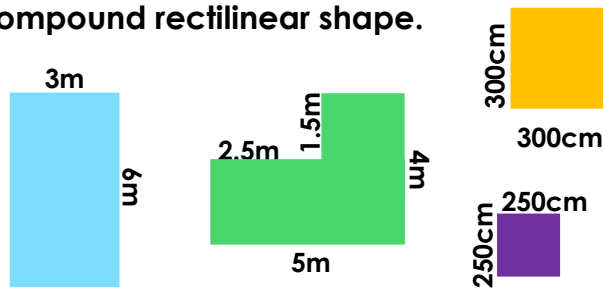


Not to scale

PS

Measure Perimeter

7b. Use the shapes below to create a compound rectilinear shape.



Calculate the perimeter of your shape.

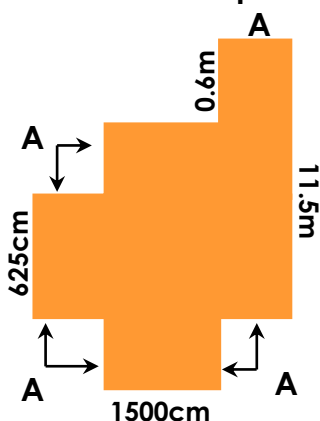
Now use the same shapes to create a compound rectilinear shape with a shorter perimeter.



Not to scale

PS

8a. The perimeter of this shape is 69m.



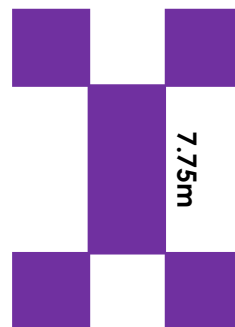
The sides labelled A are of equal length. What is the length of A? Prove it.



Not to scale

R

8b. The perimeter of this shape is 5,870cm.



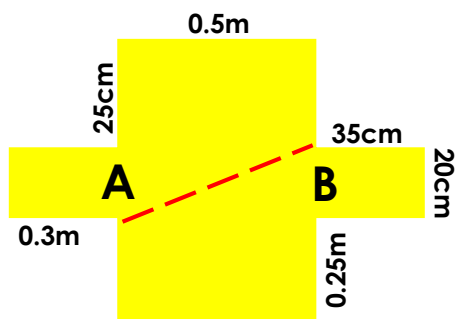
All of the unknown measurements are equal. What is unknown length? Prove it.



Not to scale

R

9a. Patrick cuts along the 50cm dotted line. He thinks the new perimeters are: A = 2.05m and B = 2.3m.



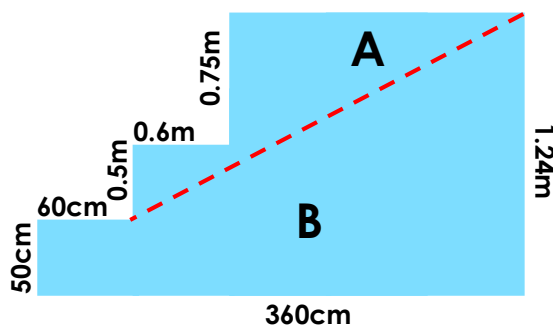
Is Patrick correct? Prove it.



Not to scale

R

9b. Phillipa cuts along the 1.85m dotted line. She thinks the new perimeters are: A = 6.1m and B = 7.79m.



Is Phillipa correct? Prove it.



Not to scale

R

Reasoning and Problem Solving Measure Perimeter

Developing

1a. Various answers, for example:



Perimeter = 16m

Children should also compare with a neighbour.

2a. A = 5m. The two given sides have a sum of 8m. The remaining perimeter (10m) is shared over 2 equal sides, therefore each side is 5m.

3a. Theo is correct because:

$$A = 40\text{cm} + 40\text{cm} + 20\text{cm} + 20\text{cm} = 120\text{ cm}$$

$$B = 70\text{cm} + 70\text{cm} + 40\text{cm} + 40\text{cm} = 220\text{cm}$$

Expected

4a. Various answers, for example:



Perimeter = 30m

Perimeter = 26m

5a. The perimeter that can be worked out from the measurements provided is 60cm. Therefore, the combined total for A and B must be 4m. Various possible answers, for example:

A = 1.5m and B = 2.5m.

6a. Orla is incorrect because:

$$A = 9\text{cm} + 9\text{cm} + 1.5\text{cm} + 1.5\text{cm} = 21\text{cm}$$

$$B = 3\text{cm} - 1.5\text{cm} = 1.5\text{cm and } 9\text{cm} - 4.5\text{cm} = 4.5\text{cm}$$

$$\text{Therefore, } 1.5\text{cm} + 4.5\text{cm} + 7\text{cm} + 4.5\text{cm} + 7\text{cm} + 1.5\text{cm} + 9\text{cm} = 35\text{cm}$$

Greater Depth

7a. Various answers, for example:



Perimeter = 72cm

Perimeter = 86cm

8a. A = 2.95m (295cm)

7 unknown sides

$$6.25\text{m} + 15.0\text{m} + 0.6\text{m} + 11.5\text{m} + 15.0\text{m} = 48.35\text{m}$$

$$69\text{m} - 48.35\text{m} = 20.65\text{m}$$

$$20.65\text{m} (2,065\text{cm}) \div 7 = 2.95\text{m} (295\text{cm})$$

9a. Patrick is incorrect because:

$$A = 50\text{cm} + 20\text{cm} + 30\text{cm} + 25\text{cm} + 50\text{cm} + 25\text{cm} = 200\text{cm} = 2\text{m}$$

$$B = 50\text{cm} + 35\text{cm} + 20\text{cm} + 35\text{cm} + 25\text{cm} + 50\text{cm} + 25\text{cm} = 240\text{cm} = 2.4\text{m}$$

Reasoning and Problem Solving Measure Perimeter

Developing

1b. Various answers for example:



Perimeter = 72cm

Children should also compare with a neighbour.

2b. A = 3cm. The two given sides have a sum of 14cm. The remaining perimeter (12cm) is shared over 4 equal sides, therefore each side is 3cm.

3b. Annis is incorrect because:

$$A = 8\text{m} + 8\text{m} + 40\text{m} + 40\text{m} = 96\text{m}$$

$$B = (20\text{m} - 8\text{m} = 12\text{m}) 12\text{m} + 12\text{m} + 40\text{m} + 40\text{m} = 104\text{m}$$

Expected

4b. Various answers, for example:



Perimeter = 47m

Perimeter = 57m

5b. The perimeter that can be worked out from the measurements provided is 54cm. Therefore, the combined total for A and B must be 11cm. Various possible answers, for example:

A = 4.5cm and B = 6.5cm.

6b. Ronnie is correct because:

$$A = (45\text{m} - 15\text{m} = 29.5\text{m}) 29.5\text{m} + 29.5\text{m} + 30 + 30 = 119\text{m}$$

$$B = 15.5\text{m} + 15.5\text{m} + 30\text{m} + 30\text{m} = 91\text{m}$$

Greater Depth

7b. Various answers, for example:



Perimeter = 43m

Perimeter = 41m

8b. Each side = 240cm (2.4m)

18 unknown sides

$$7.75\text{m} \times 2 = 15.5\text{m} (1,550\text{cm})$$

$$5,870\text{cm} - 1,550\text{cm} = 4,320\text{cm}$$

$$4,320\text{cm} \div 18 = 240\text{cm}$$

9b. Phillipa is correct because:

$$A = (60\text{cm} + 60\text{cm} = 120\text{cm}) \text{ and } (360\text{cm} - 120\text{cm} = 240\text{cm})$$

$$\text{Therefore, } 185\text{cm} + 50\text{cm} + 60\text{cm} + 75\text{cm} + 240\text{cm} = 610\text{cm} = 6.1\text{m}$$

$$B = 185\text{cm} + 124\text{cm} + 360\text{cm} + 50\text{cm} + 60\text{cm} = 779\text{cm} = 7.79\text{m}$$