

Reasoning and Problem Solving

Step 2: Area and Perimeter

National Curriculum Objectives:

Mathematics Year 6: (6M7a) [Recognise that shapes with the same areas can have different perimeters and vice versa](#)

Mathematics Year 6: (6M7c) [Recognise when it is possible to use formulae for the area of shapes](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Children work out the area and perimeter of a new shape using given information. Whole numbers only, using known multiplication facts within 12×12 .

Expected Children work out the area and perimeter of a new shape using given information. Includes 2-digit by 1-digit whole numbers.

Greater Depth Children work out the area and perimeter of a new shape using given information. Includes some conversion between units of measure and decimal numbers.

Questions 2, 5 and 8 (Problem Solving)

Developing Children work out the largest and smallest areas possible using the information given. Whole numbers only, using known multiplication facts within 12×12 .

Expected Children work out the largest and smallest areas possible using the information given. Includes whole numbers and up to 2-digit by 2-digit.

Greater Depth Children work out the largest and smallest areas possible using the information given. Includes decimal numbers.

Questions 3, 6 and 9 (Reasoning)

Developing Children explain whether they agree or disagree with a statement. Whole numbers only, using known multiplication facts within 12×12 .

Expected Children explain whether they agree or disagree with a statement. Includes whole numbers only and up to 2-digit by 1-digit.

Greater Depth Children explain whether they agree or disagree with a statement. Includes decimal numbers.

More [Year 6 Perimeter, Area and Volume](#) resources.

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

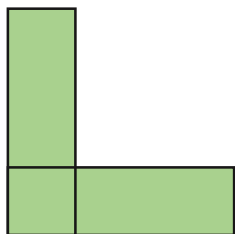
Area and Perimeter

1a. Eddie draws two equal rectangles.



He puts them together to make a new shape.

What is the area and perimeter of the new shape?

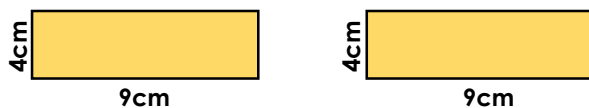


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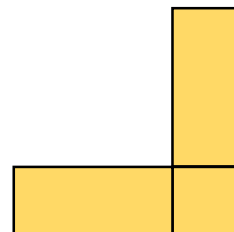
Area and Perimeter

1b. Sadie draws two equal rectangles.



She puts them together to make a new shape.

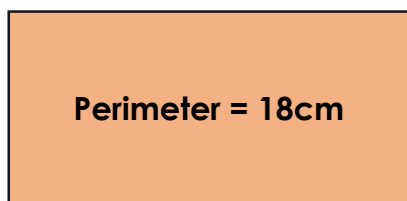
What is the area and perimeter of the new shape?



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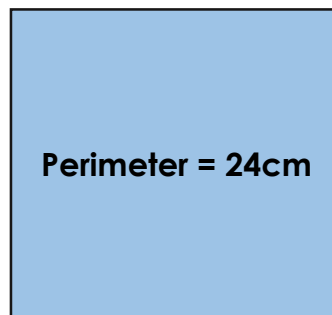
2a. A shape has a perimeter of 18cm.
What is the largest area the shape could have?
What is the smallest area the shape could have?



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PS

2b. A shape has a perimeter of 24cm.
What is the largest area the shape could have?
What is the smallest area the shape could have?



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PS

3a. Rosa says,

Squares have the same area and perimeter because you multiply by 4.



Do you agree? Prove it.



R

3b. Jacob says,

Rectangles have the same area and perimeter because you just multiply the length by width.



Do you agree? Prove it.



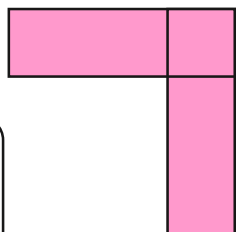
R

Area and Perimeter

4a. Freddy draws two equal rectangles.



He puts them together to make a new shape.



What is the area and perimeter of the new shape?



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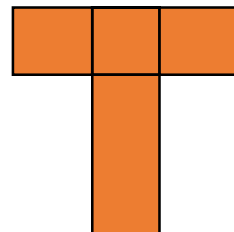
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Area and Perimeter

4b. Hayley draws two equal rectangles.



She puts them together to make a new shape.



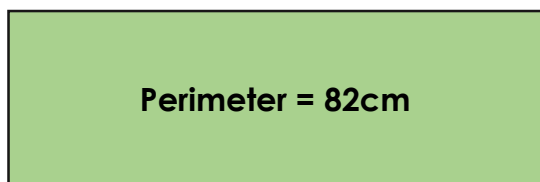
What is the area and perimeter of the new shape?



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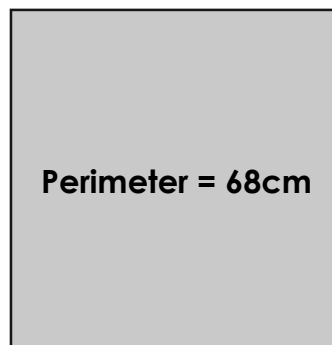
5a. A shape has a perimeter of 82cm.
What is the largest area the shape could have?
What is the smallest area the shape could have?



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5b. A shape has a perimeter of 68cm.
What is the largest area the shape could have?
What is the smallest area the shape could have?

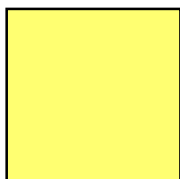


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6a. Cally says,

A square will always have the same area and perimeter.



Do you agree? Prove it.



R

6b. Brendan says,

A rectangle will always have a different area and perimeter.



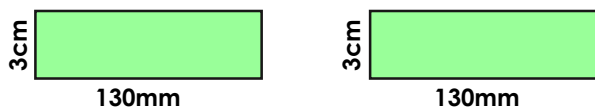
Do you agree? Prove it.



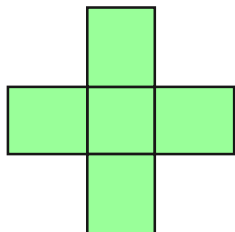
R

Area and Perimeter

7a. Hamza draws two equal rectangles.



He puts them together to make a new shape.



What is the area and perimeter of the new shape?



Not to scale

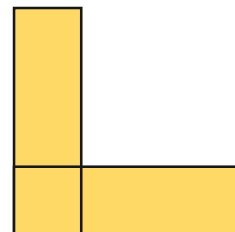
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Area and Perimeter

7b. Joanna draws two equal rectangles.



She puts them together to make a new shape.



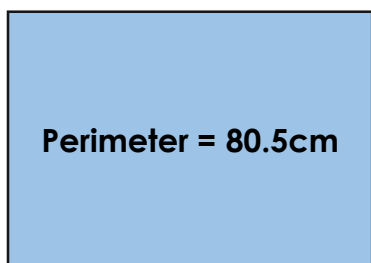
What is the area and perimeter of the new shape?



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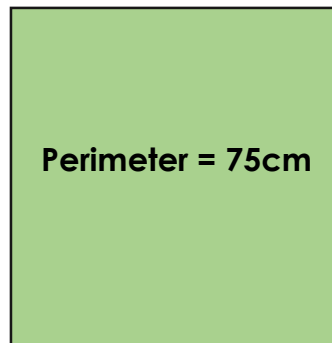
8a. A shape has a perimeter of 80.5cm.
What is the largest area the shape could have?
What is the smallest area the shape could have?



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PS

8b. A shape has a perimeter of 75cm.
What is the largest area the shape could have?
What is the smallest area the shape could have?

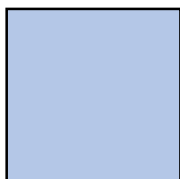


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PS

9a. Suzie says,

If a square has an area that is a decimal, then its perimeter will always be a decimal too.



Do you agree? Prove it.



R

9b. Kevin says,

If a rectangle has a perimeter that is a decimal, then its area will always be a decimal.



Do you agree? Prove it.



R

Reasoning and Problem Solving Area and Perimeter

Developing

1a. $A = 39\text{cm}^2$, $P = 32\text{cm}$.

2a. Largest area = $4\text{cm} \times 5\text{cm} = 20\text{cm}^2$
smallest area = $8\text{cm} \times 1\text{cm} = 8\text{cm}^2$

3a. Disagree. To find the area you multiply length by width, to find the perimeter, you add all the sides together.

Expected

4a. $A = 57\text{cm}^2$, $P = 44\text{cm}$.

5a. Largest area = $20\text{cm} \times 21\text{cm} = 420\text{cm}^2$
smallest area = $40\text{cm} \times 1\text{cm} = 40\text{cm}^2$

6a. Disagree. Some squares have equal area and perimeter, for example $4\text{cm} \times 4\text{cm}$, however others do not, such as $5\text{cm} \times 5\text{cm}$.

Greater Depth

7a. $A = 69\text{cm}^2$, $P = 52\text{cm}$.

8a. Largest area = $20\text{cm} \times 20.25\text{cm} = 405\text{cm}^2$ (Accept this answer. However, if children wish to take this further, other decimals can produce larger areas such as $20.1\text{cm} \times 20.15\text{cm} = 405.015$. This may require a calculator).

smallest area = $40\text{cm} \times 0.25\text{cm} = 10\text{cm}^2$

9a. Disagree. If the area of a square has a decimal number, then the perimeter might not be a decimal. For example;
Perimeter = $4.5\text{cm} + 4.5\text{cm} + 4.5\text{cm} + 4.5\text{cm} = 18\text{cm}$.

Area = $4.5 \times 4.5 = 20.25\text{cm}^2$.

Reasoning and Problem Solving Area and Perimeter

Developing

1b. $A = 56\text{cm}^2$, $P = 36\text{cm}$.

2b. Largest area = $6\text{cm} \times 6\text{cm} = 36\text{cm}^2$
smallest area = $11\text{cm} \times 1\text{cm} = 11\text{cm}^2$

3b. Disagree. To find the area, you multiply length by width and to find the perimeter you add all the sides together.

Expected

4b. $A = 44\text{cm}^2$, $P = 48\text{cm}$.

5b. Largest area = $17\text{cm} \times 17\text{cm} = 289\text{cm}^2$
smallest area = $33\text{cm} \times 1\text{cm} = 33\text{cm}^2$

6b. Disagree. Some rectangles have equal area and perimeter, for example $3\text{cm} \times 6\text{cm}$, however others do not, such as $7\text{cm} \times 5\text{cm}$.

Greater Depth

7b. $A = 85.75\text{cm}^2$, $P = 56\text{cm}$.

8b. Largest area = $18.5\text{cm} \times 19\text{cm} = 351.5\text{cm}^2$

smallest area = $37\text{cm} \times 0.5\text{cm} = 18.5\text{cm}^2$

9b. Disagree. You can have a rectangle that has a perimeter with a decimal number but has a whole number area. For example; Perimeter = $1.2\text{cm} + 5\text{cm} + 1.2\text{cm} + 5\text{cm} = 12.4\text{cm}$.

Area = $1.2 \times 5 = 6\text{cm}^2$.