Reasoning and Problem Solving
Step 1: Shapes – Same Area

National Curriculum Objectives:

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

Differentiation:

Questions 1, 4 and 7 (Problem Solving)
Developing Draw the correct rectilinear shapes to the given specifications. Up to six-sided rectilinear shapes with a maximum area of 16cm^2. Whole numbers only, using known multiplication facts within 12 x 12.
Expected Draw the correct rectilinear shapes to the given specifications. Up to eight-sided rectilinear shapes with a maximum area of 24cm^2. Whole numbers and decimals to 1dp (0.5) are used for the length and width of the sides.
Greater Depth Draw the correct rectilinear shapes to the given specifications. Up to eight-sided rectilinear shapes with a perimeter numerically greater than the area. Whole numbers and decimals to 2 dp are used for the length and width of the sides.

Questions 2, 5 and 8 (Reasoning)
Developing State whether all the given shapes have the same area by calculating and comparing the area of each shape. Whole numbers only, using known multiplication facts within 12 x 12.
Expected State whether all the given shapes have the same area by calculating and comparing the area of each shape. Whole numbers and decimals to 1dp (0.5) are used for the length and width of the sides.
Greater Depth State whether all the given shapes have the same area by calculating and comparing the area of each shape. Whole numbers and decimals to 2 dp are used for the length and width of the sides. Includes conversions (mm to cm, cm to m and mm to m).

Questions 3, 6 and 9 (Reasoning)
Developing Explain whether a statement about the possible area of a rectangle is correct. Whole numbers only, using known multiplication facts within 12 x 12.
Expected Explain whether a statement about the possible area of a rectilinear shape is correct. Whole numbers and decimals to 1dp (0.5) are used for the length and width of the sides.
Greater Depth Explain whether a statement about the possible area of a rectilinear shape is correct. Whole numbers and decimals to 2 dp are used for the length and width of the sides. Includes conversions (mm to cm, cm to m and mm to m).

More Perimeter, Area and Volume resources.

Did you like this resource? Don't forget to review it on our website.

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Shapes – Same Area

1a. Warren says,

> I can draw a four-sided and a six-sided rectilinear shape with an area of 12cm².

Draw two shapes to prove that Warren is correct.

PS

1b. Cailyn says,

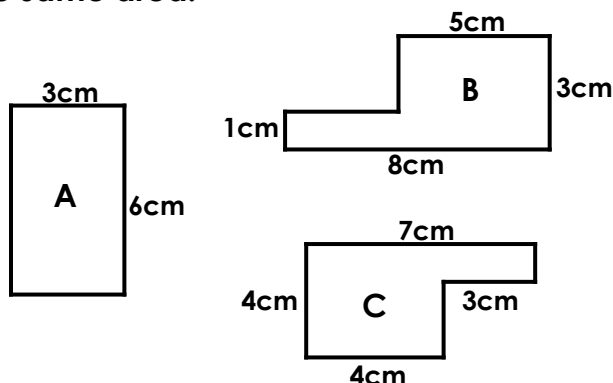> I can draw a four-sided and a six-sided rectilinear shape with an area of 16cm².

Draw two shapes to prove that Cailyn is correct.

PS

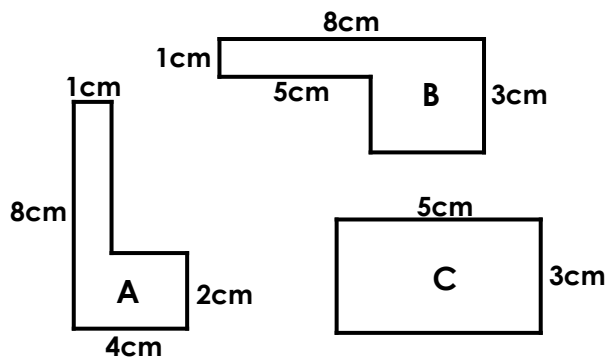**2a. True or false?** All of these shapes have the same area.

3cm

A

6cm

5cm

B

3cm

1cm

8cm

7cm

C

4cm   3cm

4cm

Explain your answer.

not to scale

R

2b. True or false? All of these shapes have the same area.

8cm

1cm

B

5cm   3cm

1cm

8cm

A   2cm

4cm

5cm

C   3cm

Explain your answer.

not to scale

R

3a. Zak is experimenting with the area of rectangles.

He says,

"If a rectangle has an area of 24cm², the length of it could be 6cm."

Is he correct? Explain why.

R

3b. Ruby is experimenting with the area of rectangles.

She says,

"If a rectangle has a length of 8cm, and the unknown length is an integer, the area could be 27cm²."

Is she correct? Explain why.

R

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Reasoning and Problem Solving – Shapes – Same Area – Year 6 Developing

Shapes – Same Area

4a. Suzi says,

> I can draw a six-sided and an eight-sided rectilinear shape with an area of 18cm².

Draw two shapes to prove that Suzi is correct. Your shapes must include some half squares.
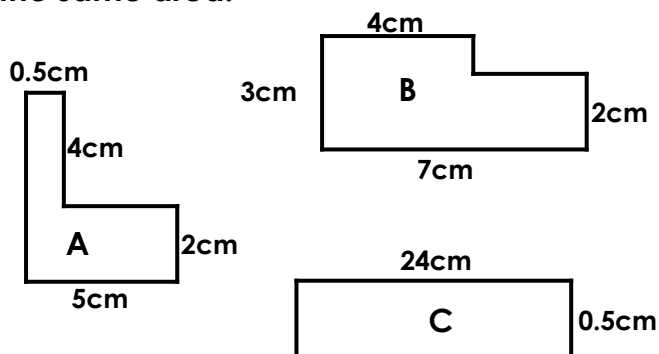
PS

4b. Jasper says,

> I can draw a six-sided and an eight-sided rectilinear shape with an area of 22cm².

Draw two shapes to prove that Jasper is correct. Your shapes must include some half squares.

PS

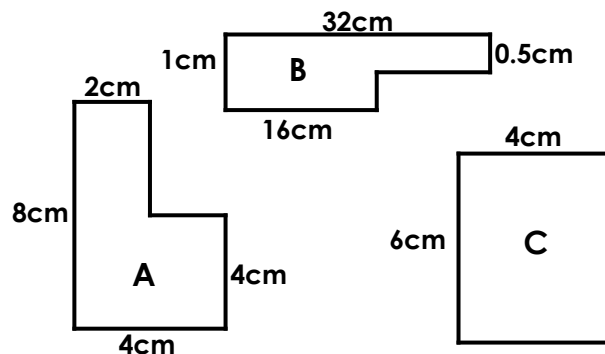**5a.** True or false? All of these shapes have the same area.

0.5cm

4cm

A
5cm
2cm

4cm

B
3cm
2cm
7cm

24cm
C
0.5cm

Explain your answer.

not to scale

R

5b. True or false? All of these shapes have the same area.

32cm

1cm
B
0.5cm
16cm

2cm

8cm

A
4cm
4cm

4cm

6cm
C

Explain your answer.

not to scale

R

6a. Taylor is experimenting with the area of rectilinear shapes.

She says,

"If a shape has an area of 19cm², the length of it could be 38cm."

Is she correct? Explain why.

R

6b. Alfie is experimenting with the area of rectilinear shapes.

He says,

"If a shape has a length of 8.5cm, the area could be 33cm²."

Is he correct? Explain why.

R

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Reasoning and Problem Solving – Shapes – Same Area – Year 6 Expected

7a. Reilly says,

> I can draw a six-sided and an eight-sided rectilinear shape with an area of 26.5cm^2.

Draw two shapes to prove that Reilly is correct. Your shapes must include some half or quarter squares.
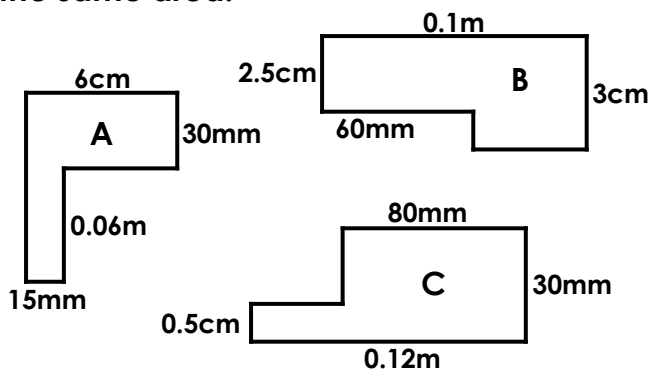
GD — PS

7b. Maggie says,

> I can draw a six-sided and an eight-sided rectilinear shape with an area of 30.25cm^2.

Draw two shapes to prove that Maggie is correct. Your shapes must include some half or quarter squares.

GD — PS

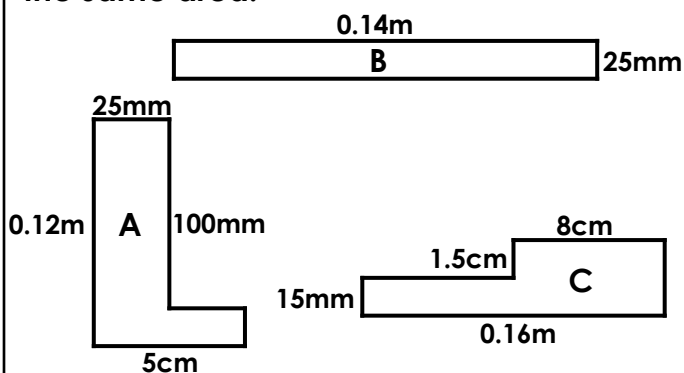**8a.** True or false? All of these shapes have the same area.

Shape A: 6cm, 30mm, 0.06m, 15mm
Shape B: 0.1m, 2.5cm, 60mm, 3cm
Shape C: 80mm, 0.5cm, 0.12m, 30mm

Explain your answer.

GD — *not to scale* — R

8b. True or false? All of these shapes have the same area.

Shape B: 0.14m, 25mm
Shape A: 25mm, 0.12m, 100mm, 5cm
Shape C: 8cm, 1.5cm, 15mm, 0.16m

Explain your answer.

GD — *not to scale* — R

9a. Nate is experimenting with the area of rectilinear shapes.

He says,

"If a shape has an area of 36cm^2, the length of it could be 65mm."

Is he correct? Explain why.

GD — R

9b. Isabelle is experimenting with the area of rectilinear shapes.

She says,

"If a shape has a length of 25cm, the area could be 7cm^2."

Is she correct? Explain why.

GD — R

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Reasoning and Problem Solving – Shapes – Same Area – Year 6 Greater Depth

Reasoning and Problem Solving
Shapes – Same Area

Developing

1a. Various answers, for example:

1cm ↔ 1cm ↕

4 sides   6 sides

2a. False. Shape A and B have an area of 18cm², but shape C has an area of 19cm².

3a. Yes, he is correct. A shape with a length of 6cm and a width of 4cm will have an area of 24cm².

Expected

4a. Various answers, for example:

1cm ↔ 1cm ↕

6 sides   8 sides

5a. False. Shape A and C have an area of 12cm², but shape B has an area of 18cm².

6a. Yes, she is correct. A shape with a length of 38cm and a width of 0.5cm would have an area of 19cm².

Greater Depth

7a. Various answers, for example:

1cm ↔ 1cm ↕

6 sides   8 sides

8a. False. Shape A and B have an area of 27cm², but shape C has an area of 26cm².

9a. Yes, he is correct. A compound shape containing a rectangle 65mm by 40mm and a second rectangle, 5cm by 2cm, will have an area of 36cm².

Developing

1b. Various answers, for example:

1cm ↔ 1cm ↕

4 sides   6 sides

2b. False. Shape A and B have an area of 14cm² , but Shape C has an area of 15cm².

3b. No, she is incorrect. There are no integers that can be multiplied by 8 to produce 27.

Expected

4b. Various answers, for example:

1cm ↔ 1cm ↕

6 sides   8 sides

5b. True. All the shapes have an area of 24cm².

6b. Yes, he is correct. A rectilinear shape with a length of 8.5cm and width of 3cm, for one part and 1.5cm by 5cm for the second part, would have an area of 33cm².

Greater Depth

7b. Various answers, for example:

1cm ↔ 1cm ↕

6 sides   8 sides

8b. False. Shape A and B have an area of 35cm², but shape C has an area of 36cm².

9b. Yes, she is correct. A compound shape consisting of two rectangles, one 25cm by 0.25 (6.25cm²) and 1.25 by 3cm (3.75cm²) gives an area of 10cm².

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