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 16cm².
Expected Draw the correct rectilinear shapes to the given specifications. Up to eight-sided rectilinear shapes with a maximum area of 24cm².
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.

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.
Expected State whether all the given shapes have the same area by calculating and comparing the area of each shape. Includes conversions (mm to cm).
Greater Depth State whether all the given shapes have the same area by calculating and comparing the area of each shape. Includes conversions (mm to cm, cm to m and mm to m).

Questions 3, 6 and 9 (Reasoning)
Developing Explain whether the shapes have been sorted correctly by their areas. Whole numbers only.
Expected Explain whether the shapes have been sorted correctly by their areas. Includes conversions (mm to cm).
Greater Depth Explain whether the shapes have been sorted correctly by their areas. 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.

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 show that Warren is correct.

D PS

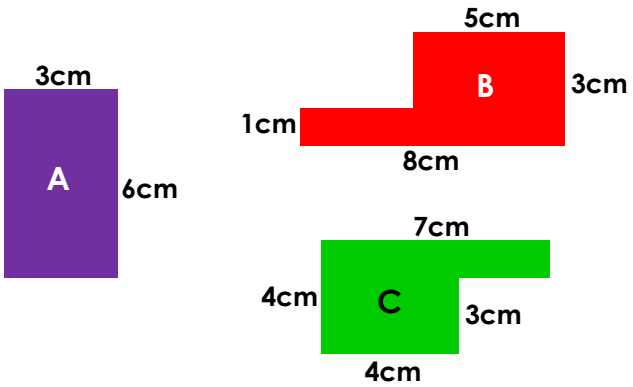
1b. Cailyn says,

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

Draw two shapes to show that Cailyn is correct.

D PS

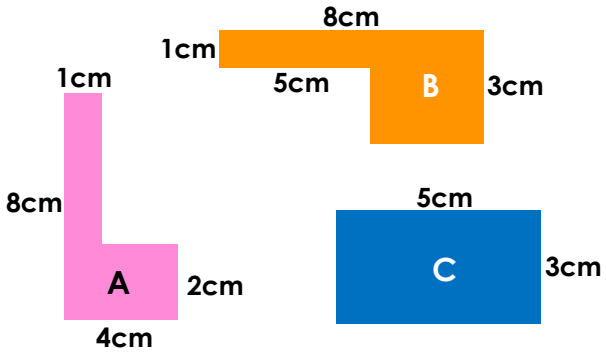
2a. True or false? All of these shapes have the same area.



Explain your answer.

D not to scale R

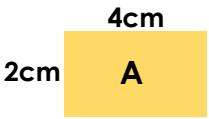
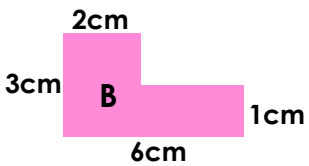
2b. True or false? All of these shapes have the same area.



Explain your answer.

D not to scale R

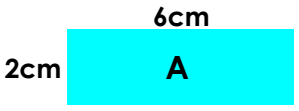
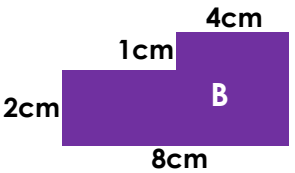
3a. Leah is sorting shapes into a table.

Area < 12cm²	Area > 12cm²
	

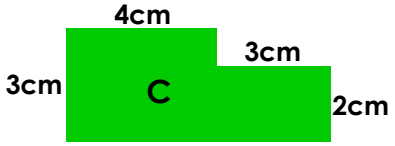
Is she correct? Prove it.
Where in the table would this shape go?

D not to scale R

3b. Alex is sorting shapes into a table.

Area < 14cm²	Area > 14cm²
	

Is he correct? Prove it.
Where in the table would this shape go?



D not to scale R

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 show that Suzi is correct.

E PS

Shapes – Same Area

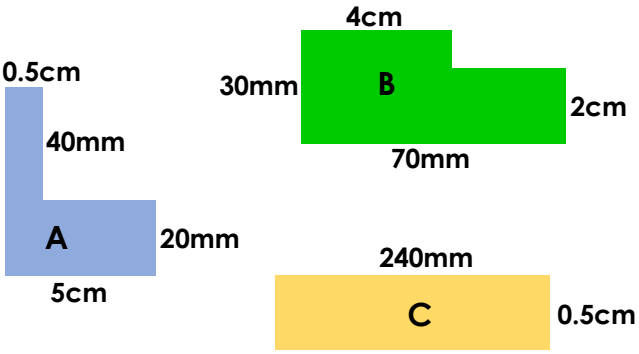
4b. Jasper says,

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

Draw two shapes to show that Jasper is correct.

E PS

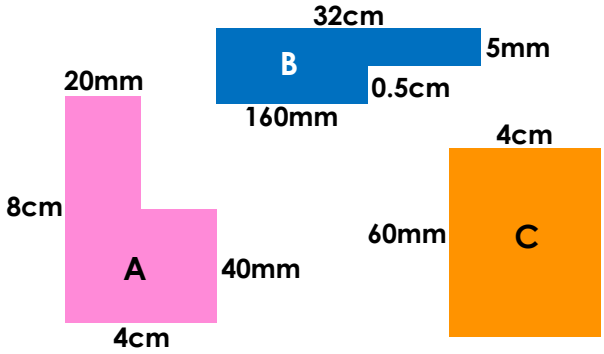
5a. True or false? All of these shapes have the same area.



Explain your answer.

E not to scale R

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



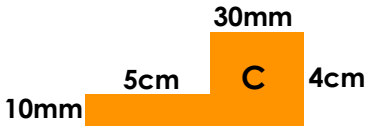
Explain your answer.

E not to scale R

6a. Justin is sorting shapes into a table.

Area < 22cm²	Area > 22cm²
3cm 70mm A 60mm 8cm	480mm B 0.5cm

Is he correct? Prove it.
Where in the table would this shape go?

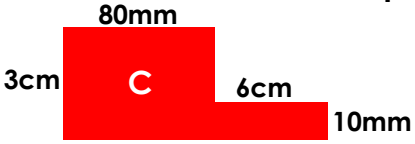


E not to scale R

6b. Sienna is sorting shapes into a table.

Area < 20cm²	Area > 20cm²
8cm 5mm A 2cm 40mm	60mm 30mm B

Is she correct? Prove it.
Where in the table would this shape go?



E not to scale R

Shapes – Same Area

Shapes – Same Area

7a. Reilly says,

I can draw a six-sided and an eight-sided rectilinear shape that have an area of 26cm² and a perimeter that is greater than 26cm.

Draw two shapes to show that Reilly is correct.

GD PS

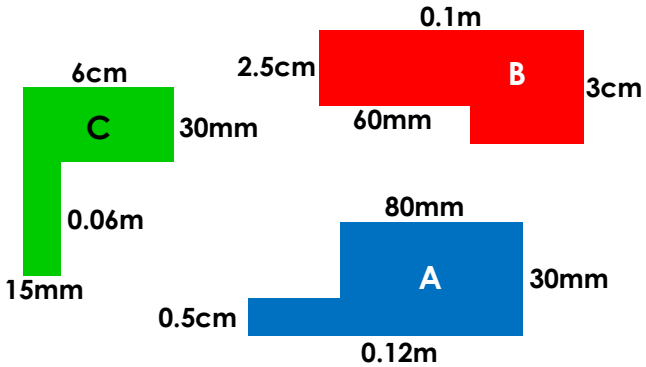
7b. Maggie says,

I can draw a six-sided and an eight-sided rectilinear shape that have an area of 30cm² and a perimeter that is greater than 30cm.

Draw two shapes to show that Maggie is correct.

GD PS

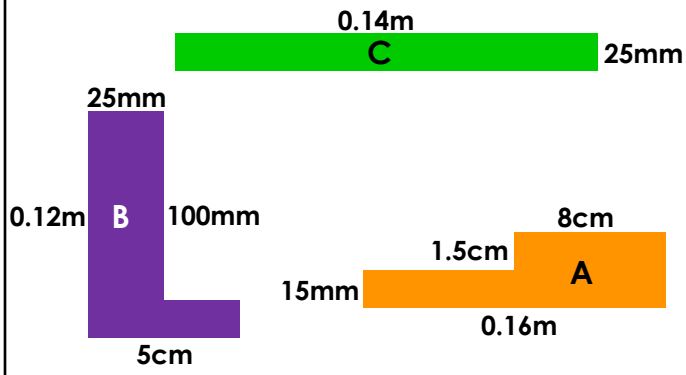
8a. True or false? All of these shapes have the same area.



Explain your answer.

GD *not to scale* R

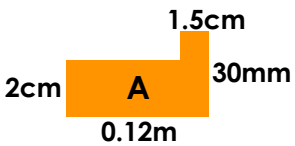
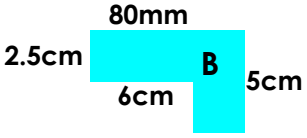
8b. True or false? All of these shapes have the same area.



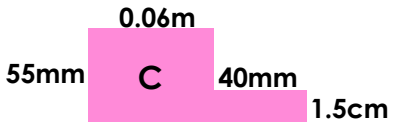
Explain your answer.

GD *not to scale* R

9a. Max is sorting shapes into a table.

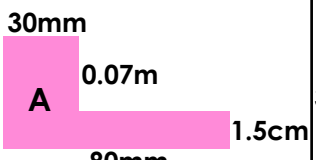
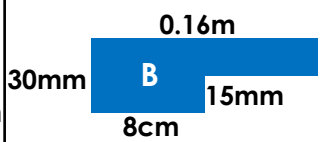
Area < 30cm²	Area > 30cm²
	

Is he correct? Prove it.
Where in the table would this shape go?

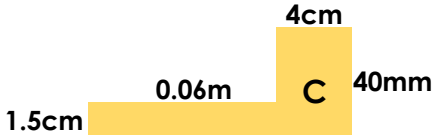


GD *not to scale* R

9b. Jack is sorting shapes into a table.

Area < 28cm²	Area > 28cm²
	

Is he correct? Prove it.
Where in the table would this shape go?



GD *not to scale* R

Reasoning and Problem Solving
Shapes – Same Area

Developing

1a. Various possibilities, accept any 4-sided and 6-sided shapes with an area of 12cm^2.

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

3a. No, she is not correct because shape B has an area of 10cm^2 so should be in the <12cm^2 column.
Shape C should go in the >12cm^2 column as it has an area of 18cm^2.

Expected

4a. Various possibilities, accept any 6-sided and 8-sided shapes with an area of 18cm^2.

5a. False. Shape A and C have an area of 12cm^2, but shape B has an area of 18cm^2.

6a. No, he is incorrect because shape A has an area of 51cm^2.
The shape C should go in the <22cm^2 column as it has an area of 17cm^2.

Greater Depth

7a. Various possibilities, accept any 6-sided and 8-sided shapes that have an area of 26cm^2 and a perimeter greater than 26cm.

8a. False. Shape B and C have an area of 27cm^2, but shape A has an area of 26cm^2.

9a. No, he is not correct as shape B has an area of 25cm^2 so should be in the <30cm^2 column.
Shape C should go in the >30cm^2 column as it has an area of 39cm^2.

Reasoning and Problem Solving
Shapes – Same Area

Developing

1b. Various possibilities, accept any 4-sided and 6-sided shapes with an area of 16cm^2.

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

3b. Yes, he is correct. Shape A has an area of 12cm^2 and shape B has an area of 20cm^2.
Shape C should go in the >14cm^2 column as it has an area of 18cm^2.

Expected

4b. Various possibilities, accept any 6-sided and 8-sided shapes with an area of 22cm^2.

5b. True. All the shapes have an area of 24cm^2.

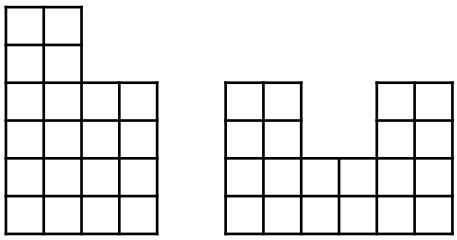
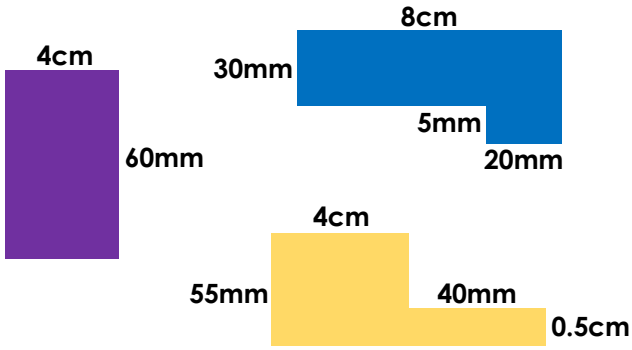
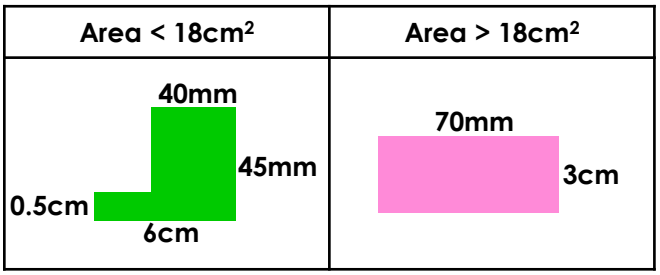
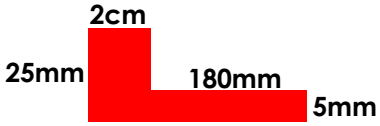
6b. No, she is not correct because shape B has an area of 18cm^2 so should be in the <20cm^2 column.
Shape C should go in the >20cm^2 column as it has an area of 30cm^2.

Greater Depth

7b. Various possibilities, accept any 6-sided and 8-sided shapes that have an area of 30cm^2 and a perimeter greater than 30cm.

8b. False. Shape B and C have an area of 35cm^2, but shape A has an area of 36cm^2.

9b. No, he is not correct because shape A has an area of 33cm^2 so should be in the >28cm^2 column.
Shape C should go in the <28cm^2 column as it has an area of 25cm^2.

PPT Slide	Answers
4c. Annie says:  I can draw a six-sided and an eight-sided rectilinear shape with an area of 20cm². **Draw two shapes to show that Annie is correct.**	**Answer** Various possibilities, accept any 6-sided and 8-sided shapes with an area of 20cm². For example: 
5c. True or false? All of these shapes have the same area.  *not to scale* **Explain your answer.**	**Answer** False, two of the shapes have an area of 24cm², but the blue rectilinear shape has an area of 25cm².
6c. Chris is sorting shapes into a table.  **Is he correct? Prove it!** **Where in the table would this shape go?**  *not to scale*	**No he is not correct as the green rectilinear shape has an area of 19cm² so should be in the >18cm² column.** **The red shape should go in the <18cm² column as it has an area of 14cm².**