

Reasoning and Problem Solving

Step 6: Calculating Scale Factors

National Curriculum Objectives:

Mathematics Year 6: (6R3) [Solve problems involving similar shapes where the scale factor is known or can be found](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Use given clues to identify the scale factor used. Involving whole numbers only.

Expected Use given clues to identify the scale factor used. Involving whole numbers in measurements but some scaled factors can increase by a half.

Greater Depth Use given clues to identify the scale factor used. Involving some decimals in measurements and some scaled factors can increase by a half.

Questions 2, 5 and 8 (Reasoning)

Developing Explain if a statement is correct. Involving whole numbers only.

Expected Explain if a statement is correct. Involving whole numbers in measurements but some scaled factors can increase by a half.

Greater Depth Explain if a statement is correct. Involving some decimals in measurements and some scaled factors can increase by a half.

Questions 3, 6 and 9 (Reasoning)

Developing Explain which scale factor has been used. Involving whole numbers only.

Expected Explain which scale factor has been used. Involving whole numbers in measurements but some scaled factors can increase by a half.

Greater Depth Explain which scale factor has been used. Involving some decimals in measurements and some scaled factors can increase by a half.

More [Year 6 Ratio](#) resources.

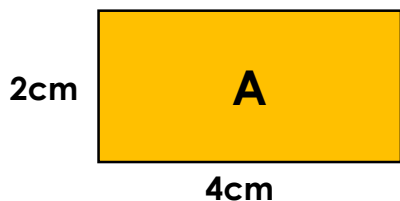
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Calculating Scale Factors

Calculating Scale Factors

1a. Shape A has been enlarged to create shape B.

Shape B has a perimeter of 48cm.



Identify which scale factor has been used.

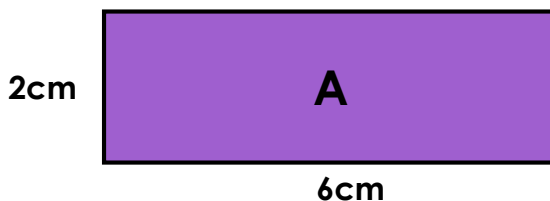


not to scale

PS

1b. Shape A has been enlarged to create shape B.

Shape B has a perimeter of 80cm.



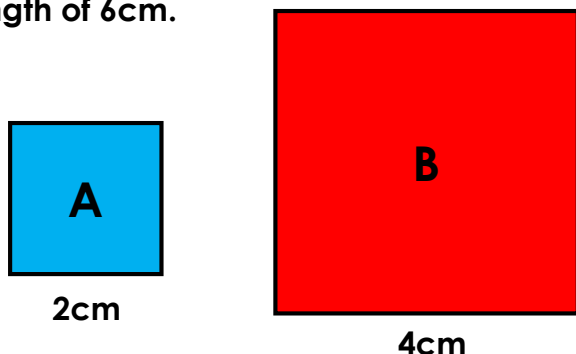
Identify which scale factor has been used.



not to scale

PS

2a. Sharon is enlarging shapes by a scale factor of 2 each time. She says that if she created shape C, one side would have a length of 6cm.



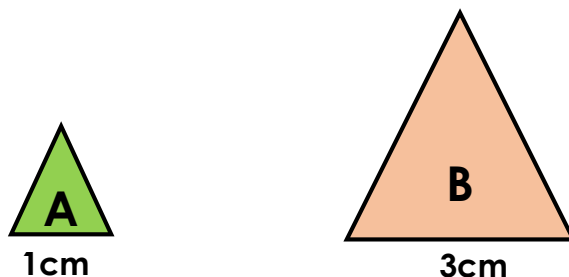
Do you agree? Explain your answer.



not to scale

R

3b. Kayden is enlarging shapes by a factor of 3 each time. He says if he created shape C, one side would have a length of 9cm.



Do you agree? Explain your answer.



not to scale

PS

3a. The perimeter of this rectangle is 16cm. When enlarged, the perimeter increases to 32cm.



What scale factor has the area of shape been increased by? Explain your answer.



not to scale

R

3b. The perimeter of this rectangle is 15cm. When enlarged, the perimeter increases to 45cm.



What scale factor has the area of shape been increased by? Explain your answer.



not to scale

R

Calculating Scale Factors

Calculating Scale Factors

4a. A rectangle has been enlarged to create shape B. Using the clues below, identify which scale factor has been used.

Shape B has an area of 54cm^2 .

The length of the original rectangle is 6cm.

The perimeter of the original rectangle is 20cm.



PS

4b. A rectangle has been enlarged to create shape B. Using the clues below, identify which scale factor has been used.

Shape B has an area of 50cm^2 .

The length of the original rectangle is 4cm.

The perimeter of the original rectangle is 12cm.

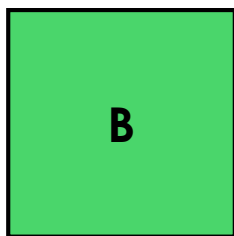


PS

5a. Eleanor has enlarged shape A to create shape B. She says if she created shape C using the same scale factor, one side would have a length of 5cm.



1cm



3cm

Do you agree? Explain your answer.



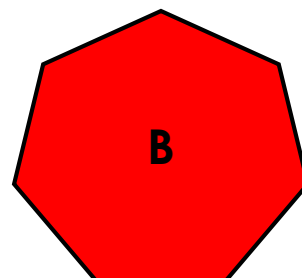
not to scale

R

5b. Bobby has enlarged shape A to create shape B. He says if he created shape C using the same scale factor, one side would have a length of 8cm.



1cm



4cm

Do you agree? Explain your answer.



not to scale

PS

6a. When enlarged, the perimeter of the shape below increases to 24cm.



What scale factor has the shape been increased by? Explain your answer.



not to scale

R

6b. When enlarged, the perimeter of the shape below increases to 49cm.



What scale factor has the shape been increased by? Explain your answer.



not to scale

R

Calculating Scale Factors

Calculating Scale Factors

7a. A square has been enlarged to create shape B. Using the clues below, identify which scale factor has been used.

The area of the original square is 6.25cm^2 .

The perimeter of shape B is 25cm.



PS

7b. A square has been enlarged to create shape B. Using the clues below, identify which scale factor has been used.

The perimeter of the original square is 7.2cm.

The area of shape B is 7.29cm^2 .

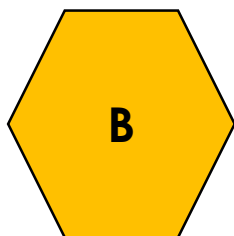


PS

8a. Jonny has enlarged shape A to create shape B. He says if he created shape C using the same scale factor, one side would have a length of 4.5cm.



1.5cm



3cm

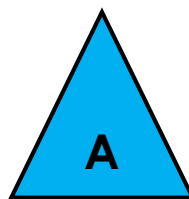
Do you agree? Explain your answer.



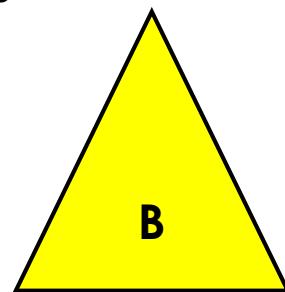
not to scale

R

8b. Amanda has enlarged shape A to create shape B. She says if she created shape C using the same scale factor, one side would have a length of 7.2cm.



2.4cm



3.6cm

Do you agree? Explain your answer.



not to scale

PS

9a. The area of this rectangle is 14cm^2 and the perimeter is 18cm. When enlarged, the length increases to 31.5cm.



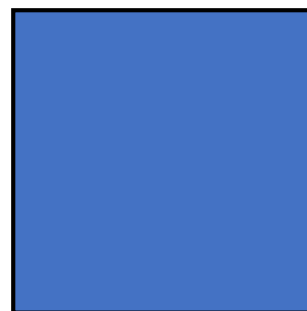
What scale factor has the shape been increased by? Explain your answer.



not to scale

R

9b. The perimeter of this square is 16cm. When enlarged, the area increases to 100cm^2 .



What scale factor has the shape been increased by? Explain your answer.



not to scale

R

Reasoning and Problem Solving

Calculating Scale Factors

Developing

- 1a. Scale factor of 4
2a. No, 2cm has been multiplied by 2 to give 4cm, then should have been multiplied by 4 again to give 8cm.
3a. A scale factor of 2 has been used.
 $16\text{cm} \times 2 = 32\text{cm}$

Expected

- 4a. Scale factor of 1.5
5a. No because shape A has been enlarged to create shape B using a scale factor of 3. Shape C would have a length of $3 \times 3 = 9\text{cm}$.
6a. Scale factor of 1.5. The perimeter of the original shape is 16cm. $16 \times 1.5 = 24$

Greater Depth

- 7a. Scale factor of 2.5
8a. Yes because shape A has been enlarged to create shape B using a scale factor of 2.
9a. Scale factor of 4.5. The length of the shape is 7cm. $31.5 \div 7 = 4.5$

Reasoning and Problem Solving

Calculating Scale Factors

Developing

- 1b. Scale factor of 5
2b. Yes, 1cm has been multiplied by 3 to give 3cm, then should be multiplied by 3 again to give 9cm.
3b. A scale factor of 3 has been used.
 $15\text{cm} \times 3 = 45\text{cm}$

Expected

- 4b. Scale factor of 2.5
5b. No because Shape B has been enlarged using a scale factor of 4, so shape C would need to have a side of $4 \times 4 = 16\text{cm}$.
6b. Scale factor of 3.5. The perimeter of the original shape is 14cm. $14 \times 3.5 = 49$

Greater Depth

- 7b. Scale factor of 1.5
8b. No because shape A has been enlarged to create shape B using a scale factor of a 1.5. Shape C would have a length of 5.4cm.
9b. Scale factor of 2.5. The area of the original shape is 16cm^2 with sides of 4cm. In order to get an area of 100cm^2 , the sides increase to 10cm. $10 \div 4 = 2.5$.