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.

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

Calculating Scale Factors

Calculating Scale Factors

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

> Shape B has a perimeter of 48cm.
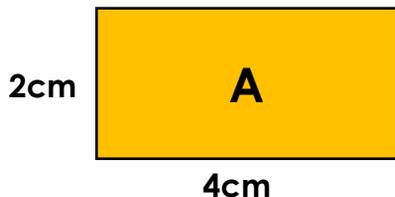
2cm | **A**
4cm

Identify which scale factor has been used.

D

not to scale PS

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

> Shape B has a perimeter of 80cm.

2cm | **A**
6cm
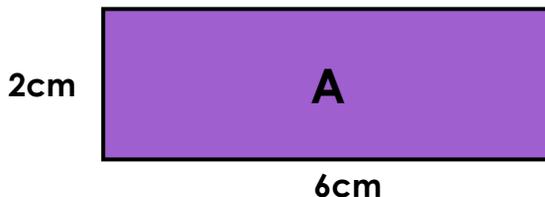
Identify which scale factor has been used.

D

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.

A
2cm

B
4cm

Do you agree? Explain your answer.

D
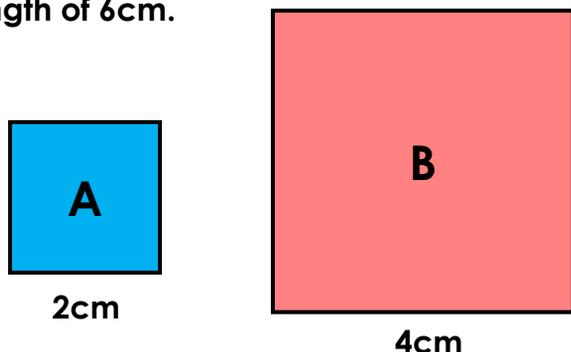
Not to scale R

2b. 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.

A
1cm

B
3cm

Do you agree? Explain your answer.

D
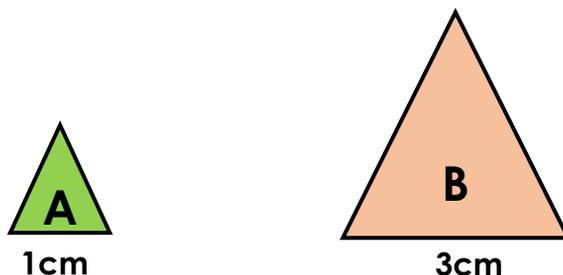
Not to scale PS

3a. When enlarged, the perimeter of the shape below increases to 32cm.

5cm
3cm

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

D

Not to scale R

3b. When enlarged, the perimeter of the shape below increases to 42cm.

4cm
3cm

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

D

Not to scale R

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Reasoning and Problem Solving – Calculating Scale Factors – Year 6 Developing

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 54cm².

> The length of the original rectangle is 6cm.

> The perimeter of the original rectangle is 20cm.

⭐ E

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 50cm².

> The length of the original rectangle is 4cm.

> The perimeter of the original rectangle is 12cm.

⭐ E

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.

B

A

1cm

3cm

Do you agree? Explain your answer.

⭐ E
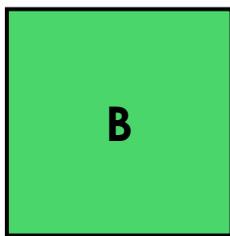
Not to scale

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.

B

A

1cm

4cm

Do you agree? Explain your answer.

⭐ E
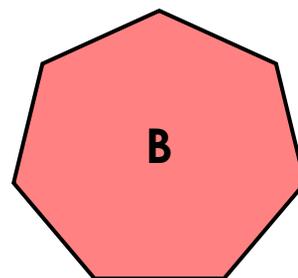
Not to scale

PS

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

6cm

2cm

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

⭐ E
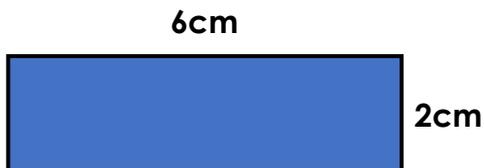
Not to scale

R

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

5cm

2cm

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

⭐ E

Not to scale

R

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Reasoning and Problem Solving – Calculating Scale Factors – Year 6 Expected

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 6.25cm².

> 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 7.29cm².

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 6cm.

A
1.5cm

B
3cm
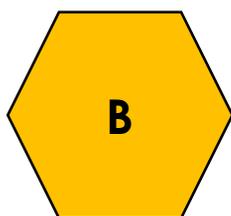
Do you agree? Explain your answer.

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.

A
2.4cm
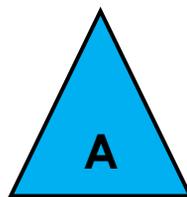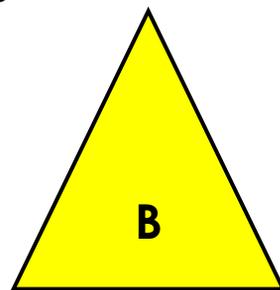
B
3.6cm

Do you agree? Explain your answer.

Not to scale

PS

9a. One side of this square is 2.2cm. When enlarged, the perimeter increases to 66cm.

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

Not to scale

R

9b. One side of this square is 4.2cm. When enlarged, the perimeter increases to 42cm.
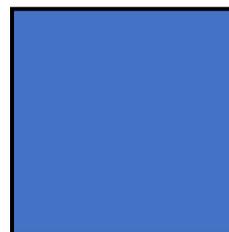
What scale factor has the shape been increased by? Explain your answer.

Not to scale

R

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Reasoning and Problem Solving – Calculating Scale Factors – Year 6 Greater Depth

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. Scale factor of 2. The perimeter of the original shape is 16cm. 16 x 2 = 32.

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 x 3 = 9cm.
6a. Scale factor of 1.5. The perimeter of the original shape is 16cm. 16 x 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 7.5. The perimeter of the square is 8.8cm. 8.8 x 7.5 = 66

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. Scale factor of 3. The perimeter of the original shape is 14cm. 14 x 3 = 42.

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 x 4 = 16cm.
6b. Scale factor of 3.5. The perimeter of the original shape is 14cm. 14 x 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 perimeter of the square is 16.8cm. 16.8 x 2.5 = 42

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Reasoning and Problem Solving – Calculating Scale Factors ANSWERS