

Reasoning and Problem Solving

Step 7: Ratio and Proportion Problems

National Curriculum Objectives:

Mathematics Year 6: (6R1) [Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts](#)

Mathematics Year 6: (6R2) [Solve problems involving the calculation of percentages \[for example, of measures, and such as 15% of 360\] and the use of percentages for comparison](#)

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

Mathematics Year 6: (6R4) [Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples](#)

Differentiation:

Questions 1, 4 and 7 (Problem Solving)

Developing Calculate the amount of items used from a given cost. Using 2 objects and prices which are whole numbers.

Expected Calculate the amount of items used from a given cost. Using 2 objects, ratios of direct multiples and prices of a mixture of pounds and pence.

Greater Depth Calculate the amount of items used from a given cost. Using 3 objects where ratios are not always direct multiples.

Questions 2, 5 and 8 (Reasoning)

Developing Explain who is correct. Using 2 objects where scale factors are double, half or ten times.

Expected Explain who is correct. Using 2 or 3 objects where scale factors are direct multiples or factors of the original values.

Greater Depth Explain who is correct. Using 3 objects where scale factors are not always direct multiples or factors, or where ratios may be simplified.

Questions 3, 6 and 9 (Problem Solving)

Developing Calculate the perimeter of 2 shapes. Scale factors are double, half or ten times.

Expected Calculate the perimeter of 2 shapes. Scale factors are direct multiples.

Greater Depth Calculate the perimeter of 2 shapes. Scale factors are not always direct multiples. Some measurements are decimals.

More [Year 6 Ratio](#) resources.

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Ratio and Proportion Problems

Ratio and Proportion Problems

1a. Hafsa is making a necklace.

She needs 4 round beads for every 3 square beads.

1 round bead costs 10p.

1 square bead costs 2p.

She has spent 92p in total.

How many of each bead has she bought?



PS

1b. Ivy is making a bracelet.

She needs 2 star beads for every 5 triangle beads.

1 star bead costs £2.

1 triangle bead costs £1.

She has spent £90 in total.

How many of each bead has she bought?



PS

2a. To make 2 bracelets, the instructions say to use 3 packs of blue beads and 2 packs of red beads.

Arlo says,



To make 4 bracelets I will need 8 packs of beads in total.

Max says,



To make 4 bracelets I will need 4 packs of red beads.

Who is correct? Explain your answer.



R

2b. To make 4 bracelets, the instructions say to use 8 packs of blue beads and 4 packs of red beads.

Hattie says,



To make 2 bracelets I will need 7 packs of beads in total.

Kelly says,



To make 2 bracelets I will need 2 packs of red beads.

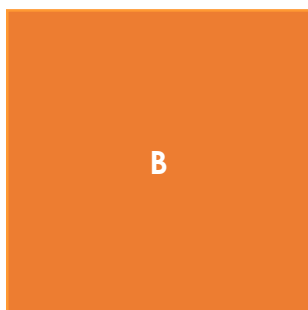
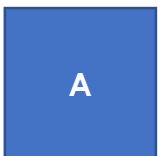
Who is correct? Explain your answer.



R

3a. Below are 2 squares. Square B has been enlarged from square A by a scale factor of 10.

Calculate the perimeter of each square.



50cm

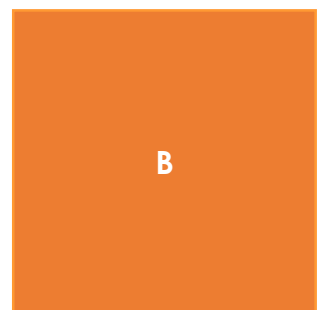
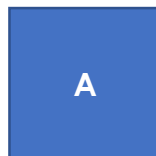
Not to scale



PS

3b. Below are 2 squares. Square B has been enlarged from square A by a scale factor of 2.

Calculate the perimeter of each square.



20cm

Not to scale



PS

Ratio and Proportion Problems

Ratio and Proportion Problems

4a. Millie is decorating a cake.

She needs 3 packs of blue sweets for every 2 packs of chocolate buttons.

1 pack of blue sweets costs 75p.
1 pack of chocolate buttons costs 80p.

She has spent £7.70 in total.

How many packs of each has she bought?



PS

4b. Hannah is decorating a cake.

She needs 4 packs of sugar flowers for every 5 packs of chocolate buttons.

1 pack of sugar flowers costs 90p.
1 pack of chocolate buttons costs £1.05.

She has spent £17.70 in total.

How many packs of each has she bought?



PS

5a. A smoothie recipe serves 2 people. It says to use 3 cherries, 5 grapes and 2 bananas.

Jaxon says,



To serve 8 people I will need 44 pieces of fruit in total.

Harry says,



To serve 8 people I will need to use 20 grapes.

Who is correct? Explain your answer.



R

5b. A smoothie recipe serves 3 people. It says to use 2 apples, 3 kiwis and 4 mangoes.

Mia says,



To serve 15 people I will need 45 pieces of fruit in total.

Flo says,



To serve 15 people I will need to use 20 mangoes.

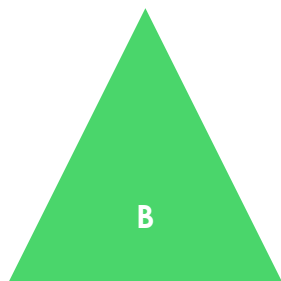
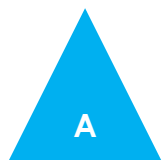
Who is correct? Explain your answer.



R

6a. Below are two equilateral triangles. Triangle B has been enlarged from triangle A by a scale factor of 5.

Calculate the perimeter of each triangle.



30cm

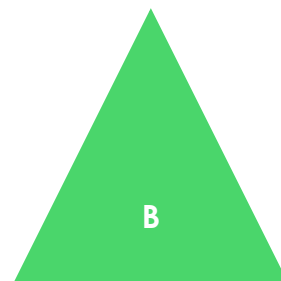
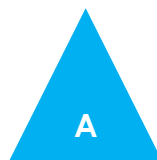
Not to scale



PS

6b. Below are two equilateral triangles. Triangle B has been enlarged from triangle A by a scale factor of 7.

Calculate the perimeter of each triangle.



49cm

Not to scale



PS

Ratio and Proportion Problems

Ratio and Proportion Problems

7a. Lucy is making photo frames using buttons. She needs 5 red buttons for every 3 blue and 4 yellow buttons.

The costs are as follows:

Red: 45p each
Blue: 90p each
Yellow: 25p each

She has spent £17.85 in total.

How many of each has she bought?



PS

7b. Molly is making photo frames using sequins. She needs 7 red sequins for every 5 blue and 2 yellow sequins.

The costs are as follows:

Red: 60p each
Blue: 70p each
Yellow: 50p each

She has spent £34.80 in total.

How many of each has she bought?



PS

8a. To create 10 cards the instructions say to use 20 straws, 50 sequins and 2 pots of glitter.

Lily says,



To make 3 cards I will need 6 straws, 15 sequins and two fifths of a pot of glitter.

Hafsa says,



To make 4 cards I will need 8 straws, 20 sequins and four fifths of a pot of glitter.

Who is correct? Explain your answer.



R

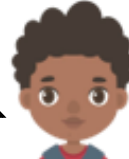
8b. To create 6 cards the instructions say to use 6 straws, 24 sequins and 3 pots of glitter.

Euan says,



To make 10 cards I will need 10 straws, 40 sequins and 5 pots of glitter.

Joe says,



To make 1 card I will need 1.5 straws, 8 sequins and 1 pot of glitter.

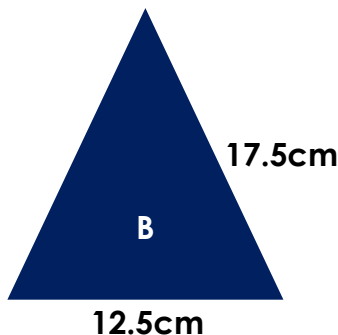
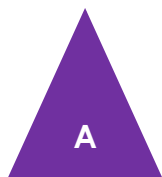
Who is correct? Explain your answer.



R

9a. Below are two isosceles triangles. Triangle B has been enlarged from triangle A by a scale factor of 2.5

Calculate the perimeter of each triangle.



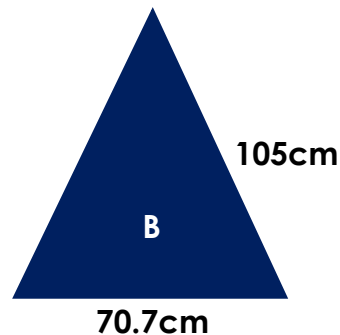
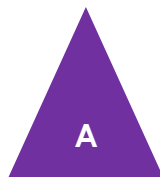
Not to scale



PS

9b. Below are two isosceles triangles. Triangle B has been enlarged from triangle A by a scale factor of 7.

Calculate the perimeter of each triangle.



Not to scale



PS

Reasoning and Problem Solving Ratio and Proportion Problems

Developing

- 1a. 8 round, 6 square
2a. Max is correct because the number of bracelets has doubled and therefore he will need 6 packs of blue and 4 packs of red which is 10 packs in total.
3a. A. $P = 20\text{cm}$, B. $P = 200\text{cm}$

Expected

- 4a. 6 packs of blue sweets; 4 packs of chocolate buttons
5a. Harry is correct because the recipe has increased by a scale factor of 4 so there will be 12 cherries, 20 grapes and 8 bananas which is 40 pieces of fruit in total.
6a. A. $P = 18\text{cm}$, B. $P = 90\text{cm}$

Greater Depth

- 7a. 15 red, 9 blue and 12 yellow
8a. Hafsa is correct; she has found the amount needed for one card and increased this by a scale factor of 4.
9a. A. $P = 19\text{cm}$, B. $P = 47.5\text{cm}$

Reasoning and Problem Solving Ratio and Proportion Problems

Developing

- 1b. 20 star, 50 triangle
2b. Kelly is correct because the number of bracelets has decreased by half so she will need 4 packs of blue beads and 2 packs of red beads which is 6 packs in total.
3b. A. $P = 40\text{cm}$, B. $P = 80\text{cm}$

Expected

- 4b. 8 packs of sugar flowers; 10 packs of chocolate buttons.
5b. Both children are correct because the recipe has increased by a scale factor of 5 so there will be 10 apples, 15 kiwis and 20 mangoes which is 45 pieces of fruit in total.
6b. A. $P = 21\text{cm}$, B. $P = 147\text{cm}$

Greater Depth

- 7b. 28 red, 20 blue and 8 yellow
8b. Evan is correct; he has found the amount needed for one card and increased this by a scale factor of 10.
9b. A. $P = 40.1\text{cm}$, B. $P = 280.7\text{cm}$