Ratio Scale - Worksheet

Skill

Group A - Ratio scales (maps and scale drawings)

Using a scale of $1 : 50\,000$. Calculate the following:

1) 1km = ? cm

2) 7km = ? cm

3) 3.5km = ? cm

4) 50km = ? cm

5) 25km = ? cm

6) 75km = ? cm

7) ? km = 1.8 cm

8) ? km = 18 cm

9) ? km = 0.18 cm

10) ? km = 16 cm

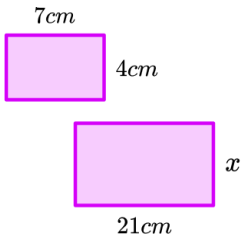
11) ? km = 32 cm

12) ? km = 64 cm

Group B - Ratio scales (lengths on similar shapes)

Given these shapes are similar, find x:

1)



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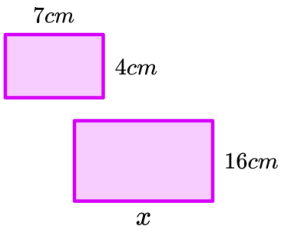

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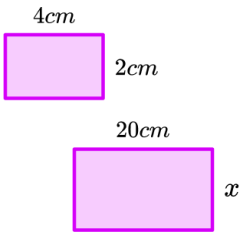

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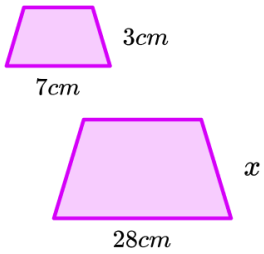

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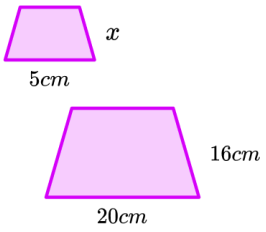

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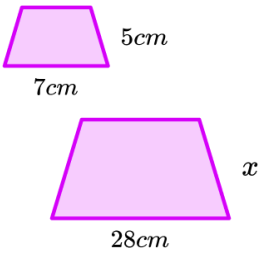

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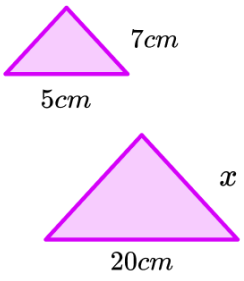

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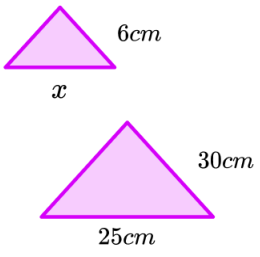

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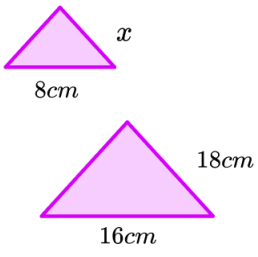
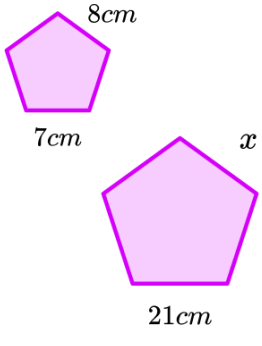


10)



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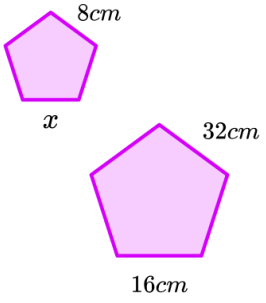
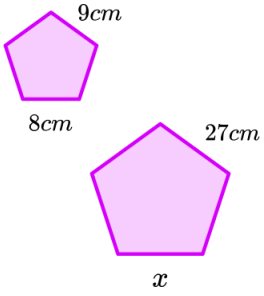


12)



Ratio Scale - Worksheet

Group C - Ratio scales (area and volume problems)

Given the similar shape ratios below, find their respective length, area or volume ratios:

1) Lengths = $1 : 5$

2) Lengths = $5 : 1$

3) Lengths = $1 : 9$

4) Lengths = $9 : 1$

5) Area = $4 : 9$

6) Area = $16 : 81$

7) Area = $25 : 100$

8) Area = $121 : 4$

9) Volume = $1 : 64$

10) Volume = $27 : 1$

11) Volume = $64 : 343$

12) Volume = $27 : 125$

Ratio Scale - Worksheet

Applied

1) **(a)** The ratio of two similar shapes' side lengths is $2 : 5$
What is the ratio of their volumes?

(b) The volume of the larger shape is 1000cm^3
Calculate the volume of the smaller shape.

2) The ratio of the areas of two similar shapes is $121x^2 : y^4$
Write the ratio of their side lengths.

3) The ratio of the volumes of two similar shapes is $8x^3 : y^6$
Write the ratio of their side lengths.

4) **(a)** A map has a scale of $2\text{cm} : 5$ kilometres.
On the map, the distance between two cities is 7cm.

What is the actual distance between the two cities in kilometres?

(b) Convert your answer into metres.

5) Solids G and H are similar.
The volume of G : the volume of H $= 27 : 1000$
Find the ratio height of G : the height of H

6) A model train is $8cm$ long.
The scale of the model is $1 : 50$
Work out the length of the real train.
Give your answer in metres.

Ratio Scale - Exam Questions

1) A map has a scale of $1 : 50\,000$. The distance between two points on the map is 15cm. Work out the real distance between the two points. Give your answer in kilometres.

.....

(3 marks)

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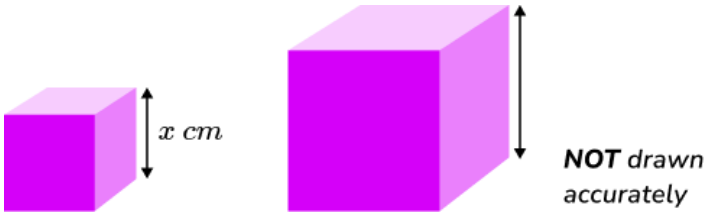
2) A delivery company uses two mathematically similar cardboard boxes for packaging.



The height of the smaller cuboid box is x.
The ratio of the volume of the smaller box to the larger box is $1 : 8$.

Find the height of the larger box. Give your answer in terms of x.

.....

(4 marks)

Ratio Scale - Exam Questions

3) A and B are similar solid cuboids.

Cross sectional area A : cross sectional area B = 9 : 25

Complete the following ratios.

(a) Length of cuboid A : Length of cuboid B

.....

(2)

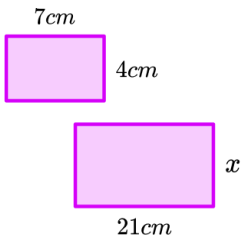
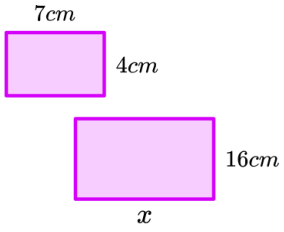
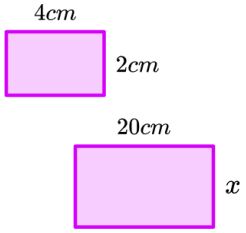
(b) Volume of cuboid A : Volume of cuboid B

.....

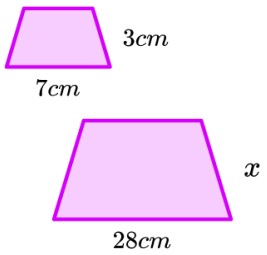
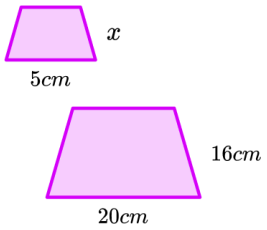
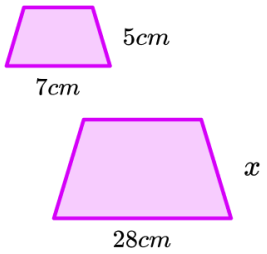
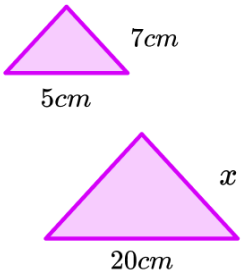
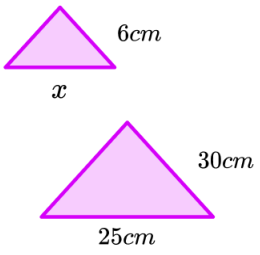
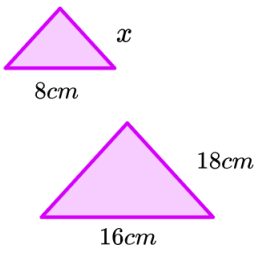
(3)

(4 marks)

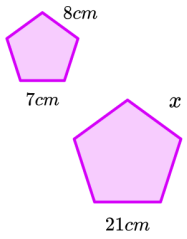
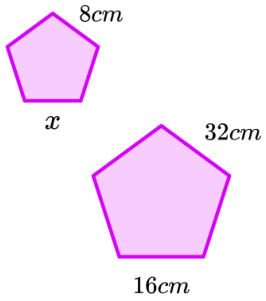
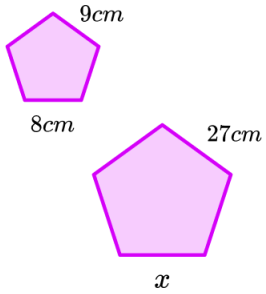
Ratio Scale - Answers

	Question	Answer
	Skill Questions	
Group A	Using a scale of $1:50\,000$. Calculate the following: **1)** $1km = ?\,cm$ **2)** $7km = ?\,cm$ **3)** $3.5km = ?\,cm$ **4)** $50km = ?\,cm$ **5)** $25km = ?\,cm$ **6)** $75km = ?\,cm$ **7)** $?\,km = 1.8cm$ **8)** $?\,km = 18cm$ **9)** $?\,km = 0.18cm$ **10)** $?\,km = 16cm$ **11)** $?\,km = 32cm$ **12)** $?\,km = 64cm$	**1)** $2cm$ **2)** $14cm$ **3)** $7cm$ **4)** $100cm$ **5)** $50cm$ **6)** $150cm$ **7)** $0.9km$ **8)** $9km$ **9)** $0.09km$ **10)** $8km$ **11)** $16km$ **12)** $32km$
Group B	Given these shapes are similar, find x: **1)**  **2)**  **3)** 	**1)** $12cm$ **2)** $28cm$ **3)** $10cm$

Ratio Scale - Answers

Group B contd	**4)** 	**4)** $12cm$
	5) 	**5)** $4cm$
	6) 	**6)** $20cm$
	7) 	**7)** $28cm$
	8) 	**8)** $5cm$
	9) 	**9)** $9cm$

Ratio Scale - Answers

Group B contd	**10)** 	**10)** $24cm$
	11) 	**11)** $4cm$
	12) 	**12)** $24cm$
Group C	Given the similar shape ratios below, find their respective length, area or volume ratios: **1)** Lengths = 1 : 5 **2)** Lengths = 5 : 1 **3)** Lengths = 1 : 9 **4)** Lengths = 9 : 1 **5)** Area = 4 : 9 **6)** Area = 16 : 81	**1)** Area = 1 : 25 Volume = 1 : 125 **2)** Area = 25 : 1 Volume = 125 : 1 **3)** Area = 1 : 81 Volume = 1 : 729 **4)** Area = 81 : 1 Volume = 729 : 1 **5)** Length = 2 : 3 Volume = 8 : 27 **6)** Length = 4 : 9 Volume = 64 : 729

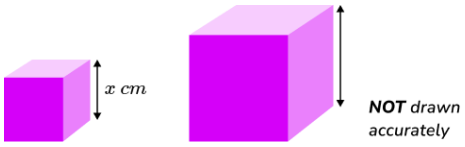
Ratio Scale - Answers

	7) Area = 25 : 100	**7)** Length = 5 : 10 Volume = 125 : 1000
	8) Area = 121 : 4	**8)** Length = 11 : 2 Volume = 1331 : 8
	9) Volume = 1 : 64	**9)** Length = 1 : 4 Area = 1 : 16
	10) Volume = 81 : 1	**10)** Length = 3 : 1 Area = 9 : 1
	11) Volume = 64 : 343	**11)** Length = 4 : 7 Area = 16 : 49
	12) Volume = 27 : 125	**12)** Length = 3 : 5 Area = 9 : 25

Ratio Scale - Answers

	Question	Answer
	Applied Questions	
1)	**a)** The ratio of two similar shapes' side lengths is $2:5$ What is the ratio of their volumes? **b)** The volume of the larger shape is $1000\ cm^3$ Calculate the volume of the smaller shape.	**a)** $8:125$ **b)** $64cm^3$
2)	The ratio of the areas of two similar shapes is $121x^2 : y^4$ Write the ratio of their side lengths.	$11x : y^2$
3)	The ratio of the volumes of two similar shapes is $8x^3 : y^6$ Write the ratio of their side lengths.	$2x : y^2$
4)	A map has a scale of $2cm:5$ kilometres On the map, the distance between two cities is $7cm$. **a)** What is the actual distance between the two cities in kilometres? **b)** Convert your answer into metres.	**a)** $17.5km$ **b)** $17500m$
5)	Solids G and H are similar. The volume of G : the volume of H $= 27:1000$ Find the ratio the height of G : the height of H	$3:10$
6)	A model train is $8cm$ long. The scale of the model is $1:50$ Work out the length of the real train. Give your answer in metres.	$4m$

Ratio Scale - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	A map has a scale of $1:50\,000$. The distance between two points on the map is $15cm$. Work out the real distance between the two points. Give your answer in kilometres.	$50\,000 \times 15 = 750000\,cm$ $750000 \div 100 \div 1000$ $7.5km$	**(1)** **(1)** **(1)**
2)	A delivery company uses two mathematically similar cardboard boxes for packaging.  The height of the smaller cuboid box is x. The ratio of the volume of the smaller box to the larger box is $1:8$. Find the height of the larger box. Give your answer in terms of x.	$\sqrt[3]{1} = 1$ $\sqrt[3]{8} = 2$ $1:2$ or $x:2x$ $2x$	**(1)** **(1)** **(1)** **(1)**
3) **(a)**	A and B are similar solid cuboids. Cross sectional area A : cross sectional area B $= 9:25$ Complete these ratios. Length of cuboid A : Length of cuboid B	**(a)** $\sqrt{9} = 3$ or $\sqrt{25} = 5$ $3:5$	**(1)** **(1)**
(b)	Volume of cuboid A : Volume of cuboid B	**(b)** $3^3 = 27$ $5^3 = 125$ $27:125$	**(1)** **(1)** **(1)**