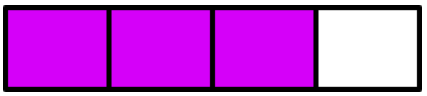
Ratio - Worksheet

Skill

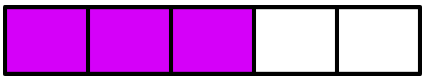
Group A - How to work out ratios

Use the bar model to answer the following questions:

1) State the ratio of grey to white tiles.

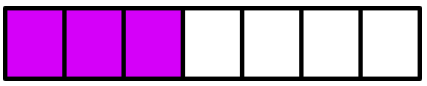


2) State the ratio of grey to the total number of tiles



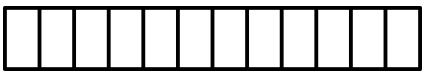
3) State the ratio of white to grey tiles

4) State the ratio of white to the total number of tiles

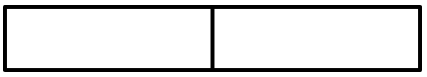


5) Complete the bar model to show the ratio of grey to white tiles in the ratio of $2:3$.

6) Complete the bar model to show the ratio of grey to white tiles in the ratio of $5:7$.



7) Complete the bar model to show the ratio of grey to white tiles given the ratio of grey to the total number of tiles is $1:5$



8) Complete the bar model to show the ratio of grey to white tiles given the ratio of white to the total number of tiles is $2:7$

9) Complete the bar model to show the ratio of grey to white tiles given the ratio of grey to the total number of tiles is $1:3$

10) Complete the bar model to show the ratio of grey to white tiles given that $1/4$ of the tiles are white.

11) Complete the bar model to show the ratio of grey to white tiles given that $2/5$ of the tiles are grey.

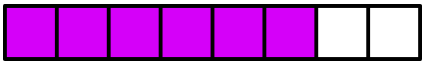
12) Complete the bar model to show the ratio of grey to white tiles given that $\frac{3}{7}$ of the tiles are white.

Group B - Simplifying ratios using bar modelling

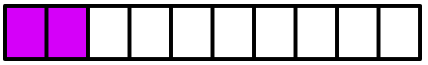
Simplify fully the ratio given in the bar model (part:part or part:part:part):

1)

2)

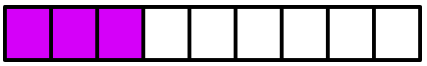


3)



4)

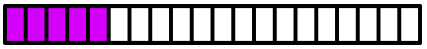
5)



6)

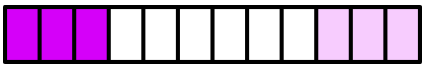
7)

8)

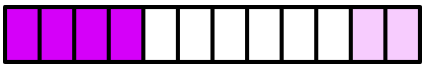


9)

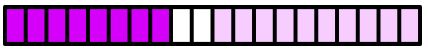
10)



11)



12)



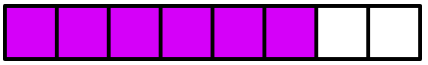
Group C - Dividing ratios using bar modelling

Divide the quantity into a ratio using a bar model:

1) Share $£100$ into the ratio below

2) Share $200L$ into the ratio below

3) Share $160m$ into the ratio below

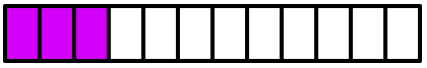


4) Share $500cm$ into the ratio below

5) Share 360° into the ratio below

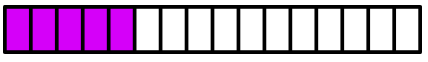
6) Share 90° into the ratio below

7) Share $132km$ into the ratio below

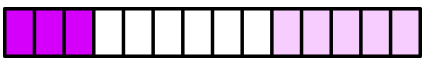


8) Share $£0.80$ into the ratio below

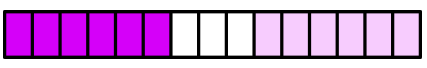
9) Share $\$16.80$ into the ratio below



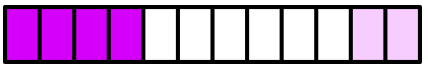
10) Share $50ml$ into the ratio below



11) Share $22.5mm$ into the ratio below



12) Share $24.12mg$ into the ratio below



Ratio - Worksheet

Applied

1) The ratio of cats to dogs is $4:9$.

(a) Draw a bar model to represent this ratio.

(b) What fraction of the animals are dogs?

2) On one day, two thirds of customers in a café ordered a coffee. The rest ordered tea.

(a) Use a bar model to express the ratio of coffee to tea.

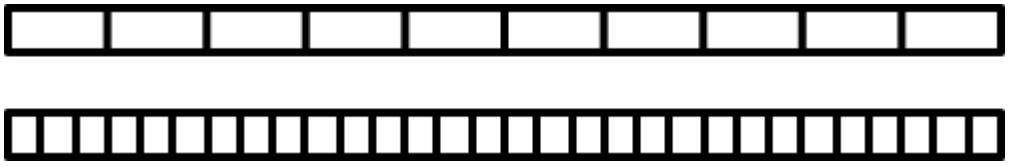
(b) Use the bar model to determine how many customers bought a coffee or a tea on that day if 23 people bought a cup of tea.

3) A striped jumper consists of three colours, white, green and pink, in the ratio of $3:2:2$ respectively.

(a) What fraction of the striped jumper is not green? Use the bar model to help you.

(b) Each jumper needs 2.5 metres of green material. How much white material is needed?

4) **(a)** Use the bar models below to show that dividing an amount into the ratio $6:4$ is the same as dividing the same amount into the ratio $18:12$.



(b) The ratio of red to blue counters is $3:5$. The ratio of blue to yellow counters is $3:8$. What is the ratio of red to yellow counters?

Ratio - Exam Questions

1) **(a)** £360 is shared between Abi and Dan in the ratio of 1: 2.

How much does Dan receive?

£.....

(2)

(b) An amount of money is shared between Ben and Frida in the ratio of 2: 5.

Frida receives £45 more than Ben.

Calculate the original amount of money.

£.....

(2)

(4 marks)

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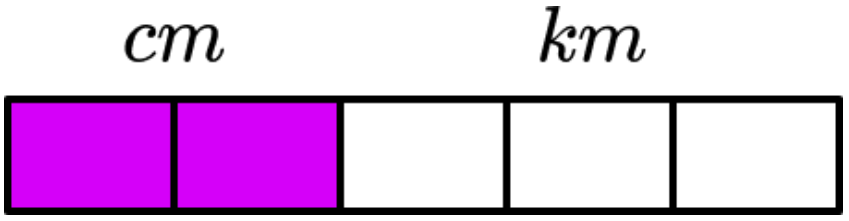
2) **(a)** The scale on a map of centimetres to kilometres is represented using a bar model.



The distance between two points on the map is $7.3cm$. What is the actual distance?

.....

(2)

(b) How far away are two points on the map if they are $12.3km$ away in real life?

.....

(2)

(4 marks)

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3) **(a)** The surface area to volume ratio for a cube is written as $6x^2 : x^3$, where $x > 0$.
What value of x would make the ratio 1: 1?

.....

(3)

(b) If the surface area of the cube is $150cm^2$, calculate the volume of the cube. State the units in your answer.

.....

(3)

(6 marks)

4) **(a)** Two people sprint $100m$. The time for each person is written below. ..... **(2)**

Person	Time (s)
A	12.4
B	11.6

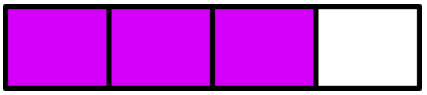
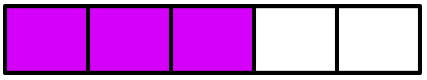
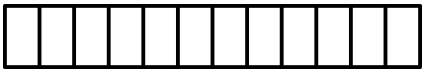
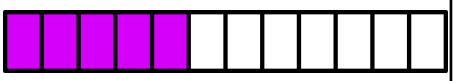
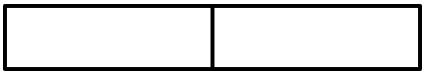
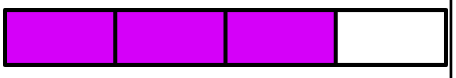
Express the ratio of their times as a ratio in its simplest form.

(b) Express the ratio of their **average speeds** as a ratio in the form $A : B$ where A and B are integers in the simplest form. ..... **(4)**

(6 marks)

What do you notice about the ratios of their times and the ratios of their average speeds?

Ratio - Answers

	Question	Answer
	Skill Questions	
Group A	Use the bar model to answer the following questions:	
	1) State the ratio of grey to white tiles. 	**1)** 3: 1
	2) State the ratio of grey to the total number of tiles 	**2)** 3: 5
	3) State the ratio of white to grey tiles 	**3)** 6: 1
	4) State the ratio of white to the total number of tiles 	**4)** 4: 7
	5) Complete the bar model to show the ratio of grey to white tiles in the ratio of 2: 3. 	**5)** 
	6) Complete the bar model to show the ratio of grey to white tiles in the ratio of 5: 7. 	**6)** 
	7) Complete the bar model to show the ratio of grey to white tiles given that 1/4 of the tiles are white. 	**7)** 

8) Complete the bar model to show the ratio of grey to white tiles given that $2/5$ of the tiles are grey.

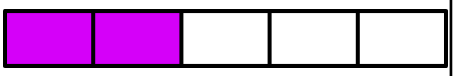
9) Complete the bar model to show the ratio of grey to white tiles given that $\frac{3}{7}$ of the tiles are white.

10) Complete the bar model to show the ratio of grey to white tiles given the ratio of grey to the total number of tiles is $1:4$.

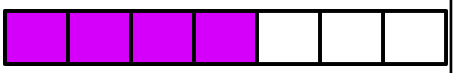
11) Complete the bar model to show the ratio of grey to white tiles given the ratio of white to the total number of tiles is $2:9$.

12) Complete the bar model to show the ratio of grey to white tiles given the ratio of grey to the total number of tiles is $1:3$.

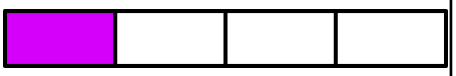
8)



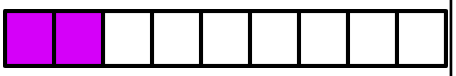
9)



10)



11)



12)

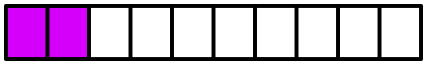
Group B

Simplify fully the ratio given in the bar model (part:part or part:part:part):

1)

2)

3)

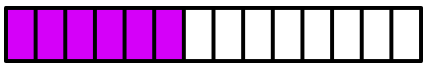


4)

5)

6)

7)



8)

9)

1) $4:4 = 1:1$

2) $6:2 = 3:1$

3) $2:8 = 1:4$

4) $6:3 = 2:1$

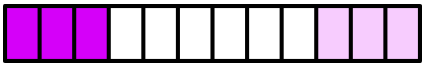
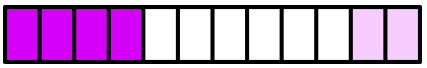
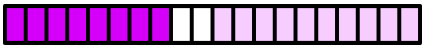
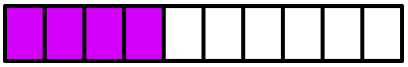
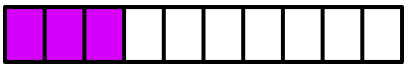
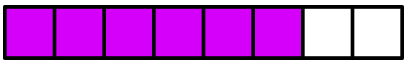
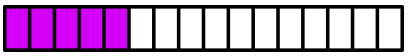
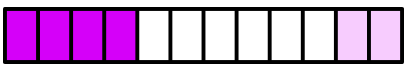
5) $3:6 = 1:2$

6) $8:4 = 2:1$

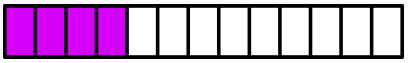
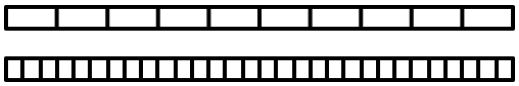
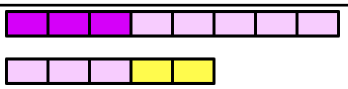
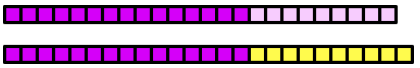
7) $6:8 = 3:4$

8) $5:15 = 1:3$

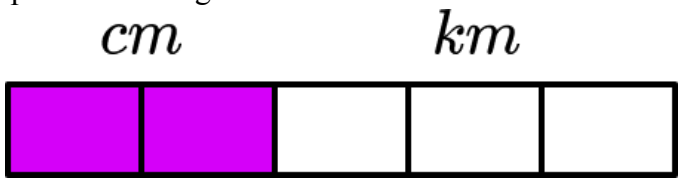
9) $6:15 = 2:5$

	10)  **11)**  **12)** 	**10)** $3:6:3 = 1:2:1$ **11)** $4:6:2 = 2:3:1$ **12)** $8:2:10 = 4:1:5$
Group C	Divide the quantity into a ratio using a bar model.	
	1) Share £100 into the ratio below 	**1)** $100 \div 10 = £10$ per share $£40:£60$
	2) Share $200L$ into the ratio below 	**2)** $200 \div 10 = 20L$ per share $60L:£140L$
	3) Share $160m$ into the ratio below 	**3)** $160 \div 8 = 20m$ per share $120m:40m$
	4) Share $500cm$ into the ratio below 	**4)** $500 \div 10 = 50cm$ per share $450cm:50cm$
	5) Share 360° into the ratio below 	**5)** $360^{o} \div 9 = 40^{o}$ per share $240^{o}:120^{o}$
	6) Share 90° into the ratio below 	**6)** $90 \div 15 = 6^{o}$ per share $66^{o}:24^{o}$
	7) Share $132km$ into the ratio below 	**7)** $132 \div 12 = 11km$ per share $33km:99km$
	8) Share £0.80 into the ratio below 	**8)** $0.80 \div 4 = £0.20$ per share $£0.60:£0.20$
	9) Share $\$16.80$ into the ratio below 	**9)** $\$16.80 \div 16 = \$1.05$ per share $\$5.25:\$11.55$
	10) Share $50ml$ into the ratio below 	**10)** $50 \div 10 = 5ml$ per share $15:30:5$
	11) Share $22.5mm$ into the ratio below 	**11)** $22.5 \div 15 = 1.5mm$ per share $9:4.5:9$
	12) Share $24.12mg$ into the ratio below 	**12)** $24.12 \div 12 = 2.01mg$ per share $8.04mg:12.06mg:4.02mg$

Ratio - Answers

	Question	Answer
	Applied Questions	
1)	The ratio of cats to dogs is $4:9$. **a)** Draw a bar model to represent this ratio.	**a)** 
	b) What fraction of the animals are dogs?	**b)** $\frac{9}{13}$
2)	On one day, two thirds of customers in a café ordered a coffee. The rest ordered tea. **a)** Use a bar model to express the ratio of coffee to tea.	**a)** 
	b) Use the bar model to determine how many customers bought a coffee or a tea on that day if 23 people bought a cup of tea.	**b)** $23 \times 3 = 69$ drinks
3)	A striped jumper consists of three colours, white, green and pink, in the ratio of $3:2:2$ respectively. **a)** What fraction of the striped jumper is not green? Use the bar model to help you.	**a)** 
	b) Each jumper needs 2.5 metres of green material. How much white material is needed?	**b)** $\frac{5}{7}$ not green $2.5 \div 2 = 1.25m$ per share $1.25 \times 3 = 3.75m$ white
4)	**a)** Use the bar models below to show that dividing an amount into the ratio $6:4$ is the same as dividing the same amount into the ratio $18:12$. 	**a)** 
	b) The ratio of red to blue counters is $3:5$. The ratio of blue to yellow counters is $3:2$. What is the ratio of red to yellow counters?	**b)**  Equivalent ratios with the number of blue shares equal to $HCF\ (3,5) = 15$  Ratio of red to yellow is $9:10$.

Ratio - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	£360 is shared between Abi and Dan in the ratio of 1: 2. How much does Dan receive?	**(a)** $360 \div 3 \times 2$ **(1)** £240 **(1)**	**(2)**
(b)	An amount of money is shared between Ben and Frida in the ratio of 2: 5. Frida receives £45 more than Ben. Calculate the original amount of money.	**(b)** $45 \div 3 \times 7$ **(1)** £105 **(1)**	**(2)**
2) (a)	The scale on a map of centimetres to kilometres is represented using a bar model.  The distance between two points on the map is $7.3cm$. What is the actual distance?	**(a)** $2cm: 3km$ $7.3 \div 2 \times 3$ **(1)** $10.95km$ **(1)**	**(2)**
(b)	How far away are two points on the map if they are $12.3km$ away in real life?	**(b)** $12.3 \div 3 \times 2$ **(1)** $8.2cm$ **(1)**	**(2)**
3) (a)	The surface area to volume ratio for a cube is written as $6x^2 : x^3$, where $x > 0$. What value of x would make the ratio 1: 1?	**(a)** Forming equation $6x^2 = x^3$ **(1)** Solving equation $0 = x^3 - 6x^2$ $0 = x^2(x - 6)$ $x = 6$ *or* $x = 0$ **(1)** Final answer $6 = x$ **(1)**	**(3)**
(b)	If the surface area of the cube is $150cm^2$, calculate the volume of the cube. State the units in your answer.	**(b)** $6x^2 = 150$ **(1)** $x^2 = 25$ so $x = 5$ **(1)** $5^3 = 125cm^3$ **(1)**	**(3)**

4) (a)	Two people sprint $100m$. The time for each person is written below. **Person** / **Time (s)** **A** / **12.4** **B** / **11.6** Express the ratio of their times as a ratio in its simplest form.	**(a)** $12.4 : 11.6$ **(1)** $= 31 : 29$ **(1)**	**(2)**
(b)	Express the ratio of their **average speeds** as a ratio in the form A:B where A and B are integers in the simplest form. What do you notice about the ratios of their times and the ratios of their average speeds?	**(b)** $S_A = \frac{100}{12.4} = \frac{1000}{124} = \frac{250}{31}$ **(1)** $S_B = \frac{100}{11.6} = \frac{1000}{116} = \frac{250}{29}$ **(1)** $\frac{250}{31} : \frac{250}{29} = 31 : 29$ **(1)** The ratios are the same **(1)**	**(4)**