

R13...Ratio Simplifying

OCR

7 (a) Write the following ratios in their simplest form.

(i) 6 : 8

(a)(i) : [1]

(ii) 600 m : 1.5 km

(ii) : [3]

(b) 64 pens cost £5.76.

How much would 80 of these pens cost?

(b) £ [2]

7 (a) Write the following ratios in their simplest form.

(i) 6 : 8

(a)(i) $\dots\dots\dots 3 \dots\dots\dots : \dots\dots\dots 4 \dots\dots\dots$ [1]

(ii) 600m : 1.5km

~~600m~~ : ~~1500m~~

6 : 15

2 : 5

(ii) $\dots\dots\dots 2 \dots\dots\dots : \dots\dots\dots 5 \dots\dots\dots$ [3]

(b) 64 pens cost £5.76.

How much would 80 of these pens cost?

64 pens = £5.76

1 pen = £0.09

80 pens =

(b) £ $\dots\dots\dots 7.20 \dots\dots\dots$ [2]

- 14 (a) A box contains only orange counters, purple counters and green counters.

A counter is taken, at random, from the box.

The probability that it is purple is $\frac{3}{10}$ and the probability that it is green is $\frac{7}{15}$.

Find the ratio of orange to purple to green counters.

(a) : : [3]

- (b) A different box contains 42 red counters, 90 yellow counters and no other counters.

A group of students share these counters between them so that they each receive the same number of red counters and the same number of yellow counters.

There are no counters left over.

How many students could be in the group?

Give all possible answers and show your reasoning.

(b) [3]

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A counter is taken, at random, from the box.

The probability that it is purple is $\frac{3}{10}$ and the probability that it is green is $\frac{7}{15}$.

Find the ratio of orange to purple to green counters.

$$O : P : G$$

$$30 : 9 : 14$$

$$\frac{30}{30} = \frac{7}{30} : \frac{9}{30} : \frac{14}{30}$$

(a) 7 : 9 : 14 [3]

(b) A different box contains 42 red counters, 90 yellow counters and no other counters.

A group of students share these counters between them so that they each receive the same number of red counters and the same number of yellow counters.

There are no counters left over.

How many students could be in the group?

Give all possible answers and show your reasoning.

42.... 1, 2, 3, 6, 7, 14, 21, 42

90.... 1, 2, 3, 5, 6, 15, 18, 30, 45, 90

9, 10

more than 1

(b) 2, 3, 6 ✓ [3]

12 (a) Three schools provide this information.

- $\frac{3}{7}$ of the pupils at Harwood are girls.
- 42% of the pupils at Crompton are girls.
- The ratio of girls to boys at Astley is 4 : 5.

Write the schools in the order of their proportion of girls, lowest to highest.
Show how you reached your answer.

(a) [4]
lowest

12 (a) Three schools provide this information.

- $\frac{3}{7}$ of the pupils at Harwood are girls.
- 42% of the pupils at Crompton are girls.
- The ratio of girls to boys at Astley is 4 : 5.

Write the schools in the order of their proportion of girls, lowest to highest.

Show how you reached your answer.

<u>Harwood</u>	Crompton	Astley
$\frac{3}{7}$	42%	$\frac{4}{9}$
0.428	0.42	0.444...

(a) Crompton Harwood Astley [4]
lowest

- 10 (a) A bag contains only green counters and black counters in the ratio 2 : 7.
There are 45 counters in the bag.

How many counters are black?

(a) [2]

- (b) A different bag contains only red counters, blue counters and yellow counters in the ratio
4 : 6 : 11.

There are 54 blue counters.

(i) How many counters are red?

(b)(i) [2]

(ii) A counter is taken at random from the bag.

What is the probability that it is yellow?

(ii) [1]

- 10 (a) A bag contains only green counters and black counters in the ratio 2 : 7.
There are 45 counters in the bag.

How many counters are black?

$45 = 9 \text{ parts}$
 $5 = 1 \text{ part}$

$G : B$
 $2 : 7$
 $\downarrow \quad \downarrow \times 5$
 $10 \quad 35$

(a) 35 [2]

- (b) A different bag contains only red counters, blue counters and yellow counters in the ratio 4 : 6 : 11.

There are 54 blue counters.

- (i) How many counters are red?

$R : B : Y$
 $4 : 6 : 11$
 $\times 9 \checkmark$
 $4 \times 9 = 36 \checkmark$

$54 = 6 \text{ parts}$
 $9 = 1 \text{ part}$

(b)(i) 36 [2]

- (ii) A counter is taken at random from the bag.

What is the probability that it is yellow?

$\frac{11}{21}$

$21 \dots 4 + 6 + 11$

(ii) [1]

2 (a) Find $\frac{1}{7}$ of 56.

(a) [1]

(b) Write 35 : 50 as a ratio in its simplest form.

(b) : [1]

(c) Write 8 mm to 12 cm as a ratio in its simplest form.

(c) : [2]

- 2 (a) Find $\frac{1}{7}$ of 56.

(a) 8 [1]

- (b) Write 35 : 50 as a ratio in its simplest form.

⑤ 35 : 50
 7 : 10

(b) 7 : 10 [1]

- (c) Write 8 mm to 12 cm as a ratio in its simplest form.

8 mm : 120 mm 1 cm = 10 mm
4 : 60
2 : 30
1 : 15

(c) 1 : 15 [2]

(c) Kiri and Peter share some sweets in the ratio 6:7.

What fraction of the sweets does Kiri receive?

(c) [1]

K P

(c) Kiri and Peter share some sweets in the ratio 6:7.

What fraction of the sweets does Kiri receive?

$$\frac{6}{13} \checkmark$$

(c) [1]

- 16** Last year, Katie earned £16 200.
Her total loan repayments were £6400.

Katie estimates that the ratio of her loan repayments to her earnings is approximately 3 : 8.

Is she correct?
Show your reasoning.

..... [3]

- 16 Last year, Katie earned £16 200.
Her total loan repayments were £6400.

Katie estimates that the ratio of her loan repayments to her earnings is approximately 3 : 8.

Is she correct?
Show your reasoning.

$$\begin{array}{l} L : E \\ \cancel{6400} : \cancel{16200} \\ 64 : 162 \\ 32 : 81 \end{array} \quad \begin{array}{l} 3 : 8 \\ 30 : 80 \\ \leftarrow \text{These are very similar} \\ \text{So yes she is correct} \end{array}$$

1 (a) Complete this table of fractions, decimals and percentages.

Fraction		Decimal		Percentage
$\frac{1}{2}$	=	0.5	=	50%
	=	0.27	=	
$\frac{4}{5}$	=		=	
	=		=	3%

[3]

(b) Write 45% as a fraction in its simplest form.

(b) [2]

(c) Alan and Brian share a sum of money in the ratio 1 : 4.

What fraction of the money does Alan receive?

(c) [1]

1 (a) Complete this table of fractions, decimals and percentages.

Fraction		Decimal		Percentage
$\frac{1}{2}$	=	0.5	=	50%
$\frac{27}{100}$	=	0.27	=	27%
$\frac{4}{5} = \frac{8}{10}$	=	0.8	=	80%
$\frac{3}{100}$	=	0.03	=	3%

[3]

(b) Write 45% as a fraction in its simplest form.

(b) $\frac{9}{20}$ [2]

(c) Alan and Brian share a sum of money in the ratio 1:4.

What fraction of the money does Alan receive?

(c) $\frac{1}{5}$ [1]

Created by W Neill

- 18** Maria mixes white paint and red paint in the ratio 2 : 3.
She makes a total of 15 litres of paint.

How much more red paint does she need to add to the mixture so that the ratio of white paint to red paint becomes 1 : 5?

..... litres **[4]**

- 18 Maria mixes white paint and red paint in the ratio 2 : 3.
She makes a total of 15 litres of paint.

How much more red paint does she need to add to the mixture so that the ratio of white paint to red paint becomes 1 : 5?

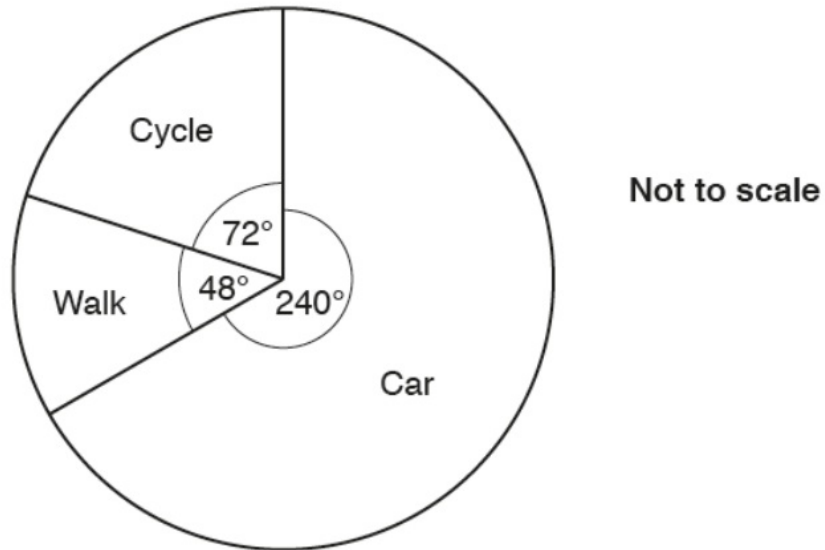
$$\begin{array}{l}
 \text{W} \quad \text{R} \\
 15 \text{ Litres} = 2 : 3 \\
 \quad \quad \quad \swarrow \quad \searrow \\
 \quad \quad \quad 6\text{L} \quad \quad 9\text{L} \\
 15 \text{ Litres} = 5 \text{ parts} \\
 3 \text{ Litres} = 1 \text{ part}
 \end{array}$$

$$\begin{array}{l}
 \text{W} : \text{R} \\
 6\text{L} : 9\text{L} \\
 1 : 3 \\
 \times 6 \quad \quad \quad \times 6 \\
 6\text{L} : 30\text{L} \\
 30 - 9 = \\
 \quad \quad \quad 21
 \end{array}$$

..... litres [4]

10 This pie chart shows how the employees of a business travel to work.

Created by W Neill

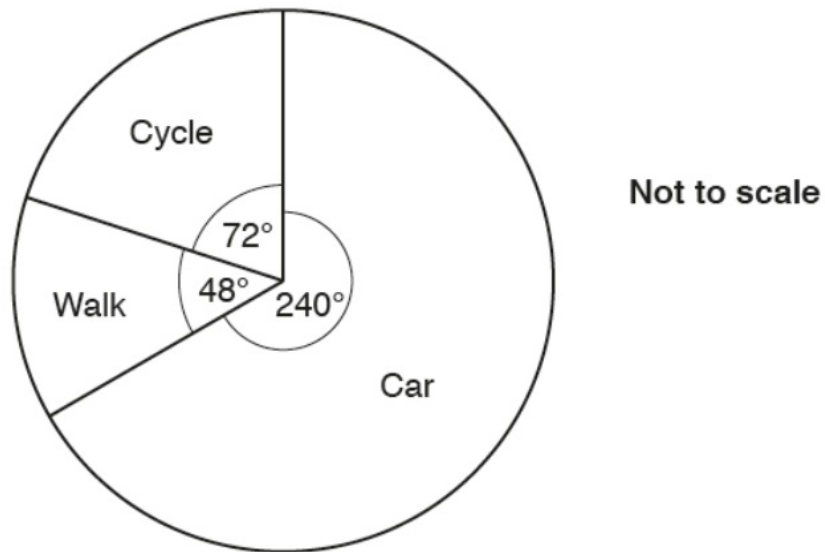


- (a) Find the ratio of the number of employees who cycle to work to the number of employees who walk to work.
Give your answer in its simplest form.

(a) : [2]

10 This pie chart shows how the employees of a business travel to work.

Created by W Neill



- (a) Find the ratio of the number of employees who cycle to work to the number of employees who walk to work.
Give your answer in its simplest form.

$$C : W$$
$$72 : 48$$
$$6 : 4$$

(a) 3 : 2 [2]

- 6 (a)** Lucy and Ben share £42.
Lucy's share is £30.

Write the ratio Lucy's share : Ben's share in its simplest form.

(a) : **[2]**

- (b)** The ratio 2.5 metres to 70 centimetres can be written in the form $1:n$.

Find the value of n .

(b) $n =$ **[2]**

- 6 (a) Lucy and Ben share £42.
Lucy's share is £30.

Write the ratio Lucy's share : Ben's share in its simplest form.

$$30 : 12$$

$$15 : 6$$

$$5 : 2$$

(a) 5 : 2 [2]

- (b) The ratio 2.5 metres to 70 centimetres can be written in the form $1 : n$.

Find the value of n .

$$2.5 \text{ metres} : 70 \text{ cm}$$

$$\begin{array}{l} \div 250 \left(\begin{array}{l} 250 \text{ cm} : 70 \text{ cm} \\ 1 : 0.28 \end{array} \right) \div 250 \end{array}$$

(b) $n =$ 0.28 [2]

16 (a) Two bags each contain only red counters and yellow counters.

In Bag A, the ratio of red counters to yellow counters is 1 : 4.

In Bag B, $\frac{1}{4}$ of the counters are red.

(i) Sharon says

The proportion of the counters that are red is the same in both bags.

Explain why Sharon is not correct.

.....

.....

..... [1]

16 (a) Two bags each contain only red counters and yellow counters.

In Bag A, the ratio of red counters to yellow counters is $1 : 4$.

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Bag A	Bag B	
$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{5} \neq \frac{1}{4}$
		so not the same [1]

5 (a) Write 12:54 as a ratio in its simplest form.

(a) : [2]

(b) The ratio 400g : 1 kg can be written in the form 1 : n .
Find the value of n .

(b) $n =$ [2]

- 5 (a) Write 12:54 as a ratio in its simplest form.

R13

$$6 : 27$$

$$2 : 9 \quad \checkmark$$

— 1000g

(a) $2 : 9$ [2]

- (b) The ratio 400g : 1 kg can be written in the form 1 : n .

R14 Find the value of n .

$$400 : 1000 \quad \div 400 \rightarrow 1 : 2.5$$

(b) $n = 2.5$ [2]

9 (a) Elise wants to divide a sum of money between Hannah and Adil in the ratio 2 : 3.

R13

Elise says:

Hannah will get $\frac{2}{3}$ of the money.

Explain why Elise is not correct.

.....

.....

[1]

(b) George has a different sum of money.
He divides the money between Siobhan and Iwan.

R13

Iwan receives $\frac{11}{17}$ of the money.

Write the ratio of the money that Siobhan receives to the money that Iwan receives.

(b) : [1]

9 (a) Elise wants to divide a sum of money between Hannah and Adil in the ratio 2 : 3. = 5 parts

R13

Elise says:

H A

Hannah will get $\frac{2}{3}$ of the money.

Explain why Elise is not correct.

Hannah should get $\frac{2}{5}$ of
the money as there is 5 parts in total [1]

- (b) George has a different sum of money.
He divides the money between Siobhan and Iwan.

R13

Iwan receives $\frac{11}{17}$ of the money.

Write the ratio of the money that Siobhan receives to the money that Iwan receives.

17 parts

$$S : I$$
$$6 : 11$$

(b) $\underline{\quad 6 \quad} : \underline{\quad 11 \quad}$ [1]

5 (a) Write 3 : 57 as a ratio in its simplest form.

R13

(a) : [1]

5 (a) Write 3 : 57 as a ratio in its simplest form.

R13

(a) $\frac{1}{19}$ [1]

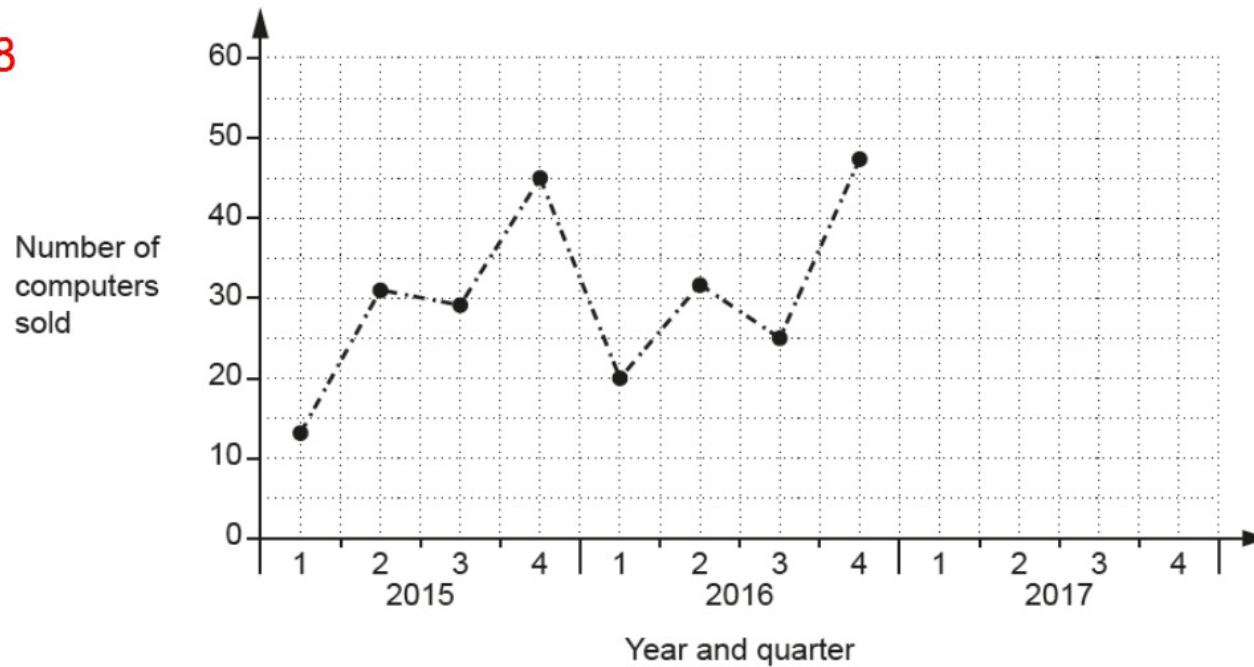
20 The table shows the number of computers sold in Tom's shop each quarter from 2015 to 2017.

Video created by Will Neill

	2015				2016				2017			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4
Number of computers sold	13	31	29	45	20	32	25	47	27	40	30	58

(a) Complete this graph using the information for 2017.

P8



[2]

- (b) Tom adds the three results for quarter 1 and he adds the three results for quarter 4.
Tom says

R13 The ratio of the **total** number of computers sold in quarter 1 compared to quarter 4 is 2 : 5.

Is he correct?
Show your reasoning.

..... [2]

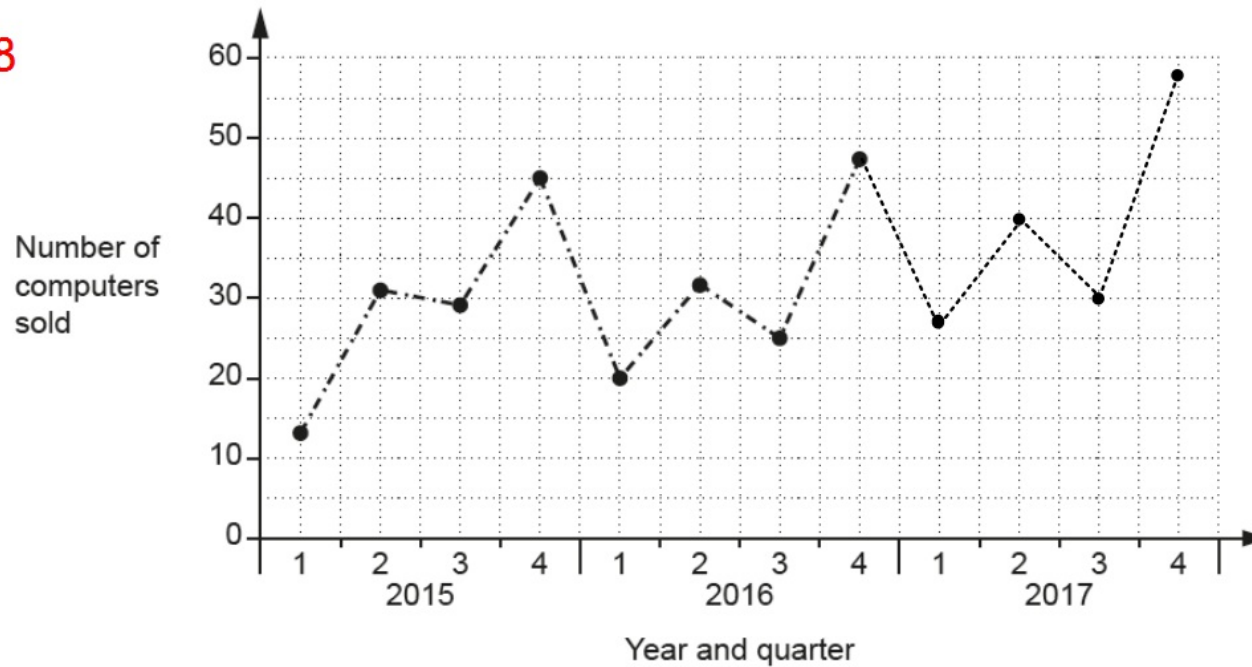
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(a) Complete this graph using the information for 2017.

P8



[2]

(b) Tom adds the three results for quarter 1 and he adds the three results for quarter 4.

R13 Tom says

The ratio of the **total** number of computers sold in quarter 1 compared to quarter 4 is 2 : 5.

Is he correct?
Show your reasoning.

Q-1
 $13 + 20 + 27$

60

Q4
45 47 58

60 : 150

6 : 15

2 : 5

$$\begin{array}{r} 45 \\ 47 \\ 58 \\ \hline 150 \end{array}$$

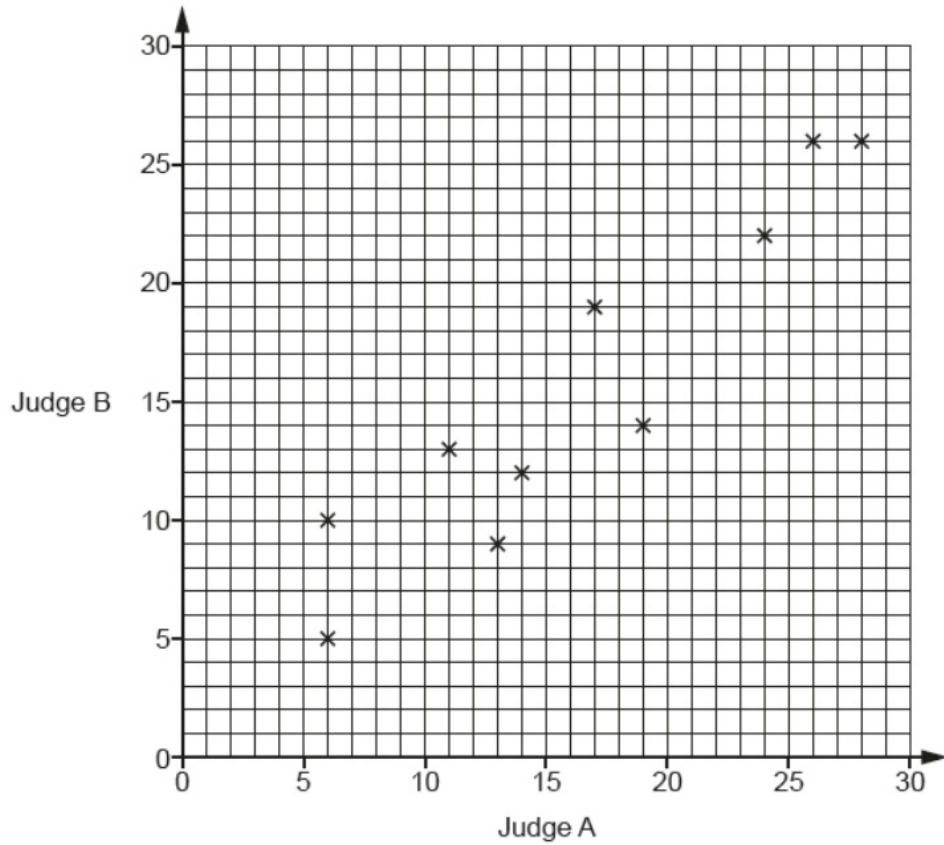
Yes he is correct ✓

[2]

(b) Dancers who are awarded a score of more than 20 by **both** judges receive a medal.

R13

For the 12 dancers, express the ratio of medal winners to non-medal winners in its simplest form.

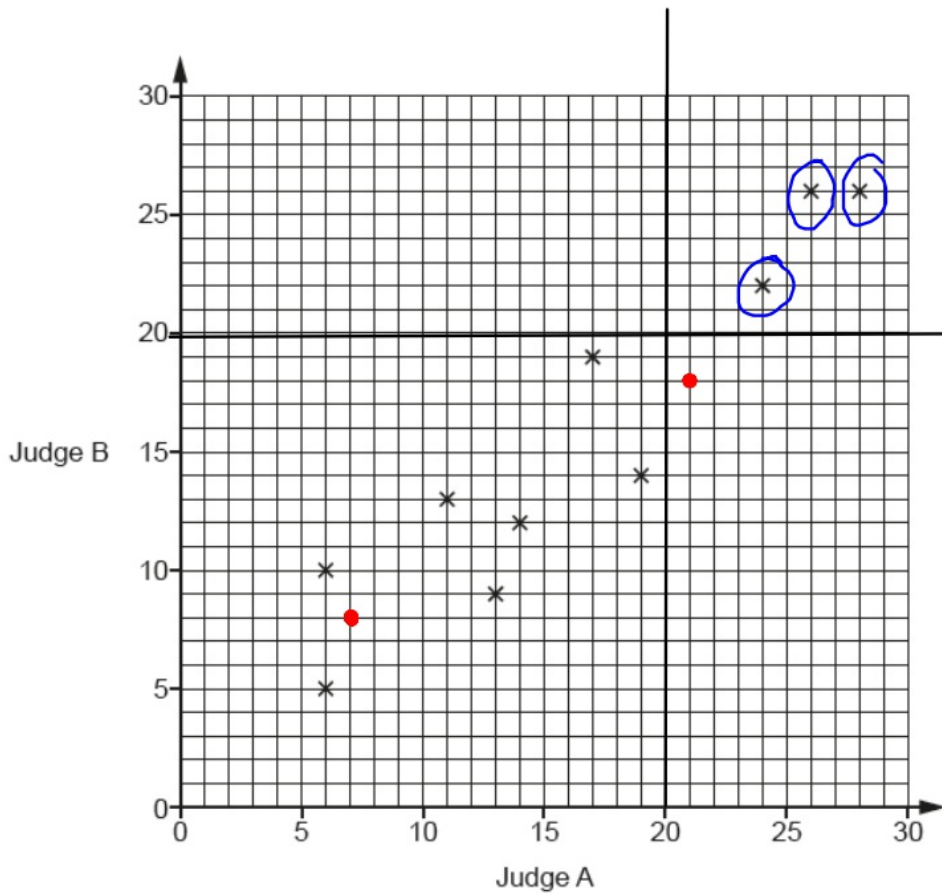


(b) : [3]

(b) Dancers who are awarded a score of more than 20 by **both** judges receive a medal.

R13

For the 12 dancers, express the ratio of medal winners to non-medal winners in its simplest form.



Winner : non medals

3 : 9

(b) 1 : 3 [3]

4 In a school, $\frac{2}{3}$ of the students study a language.

Of those students who study a language, $\frac{2}{5}$ study Spanish.

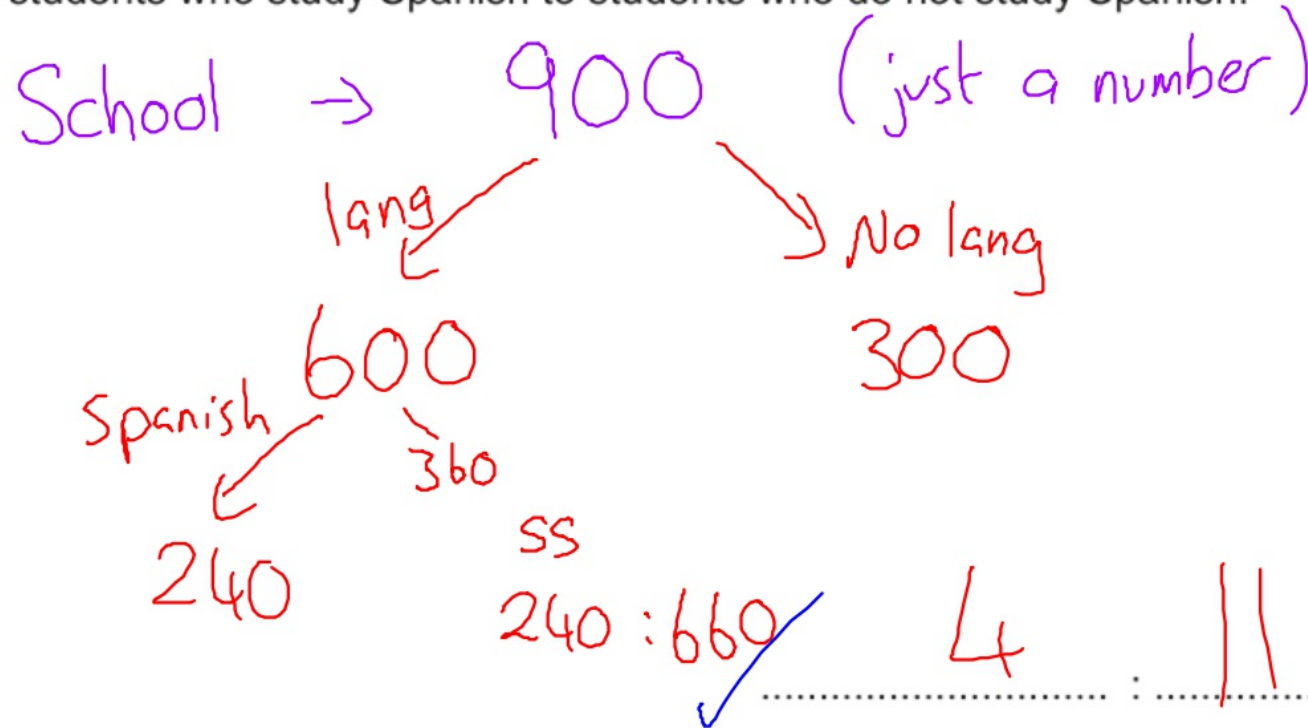
Find the ratio of students who study Spanish to students who do not study Spanish.

..... : [3]

4 In a school, $\frac{2}{3}$ of the students study a language.

R_{4a}
 R_{13} Of those students who study a language, $\frac{2}{5}$ study Spanish.

Find the ratio of students who study Spanish to students who do not study Spanish.



6 (a) Two bags each contain only red counters and yellow counters.

R13 In Bag A, the ratio of red counters to yellow counters is 1 : 4.

In Bag B, $\frac{1}{4}$ of the counters are red.

(i) Sharon says

The proportion of the counters that are red is the same in both bags.

Explain why Sharon is not correct.

.....

.....

..... [1]

Two bags each contain only red counters and yellow counters.

In Bag A, the ratio of red counters to yellow counters is 1 : 4.

In Bag B, $\frac{1}{4}$ of the counters are red.

(ii) The number of counters in the two bags is the same.

R13 Complete the table below to show how many counters of each colour could be in the bags.

	Red counters	Yellow counters
Bag A		
Bag B		

6 (a) Two bags each contain only red counters and yellow counters.

R13 In Bag A, the ratio of red counters to yellow counters is $1 : 4$.

In Bag B, $\frac{1}{4}$ of the counters are red.

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Explain why Sharon is not correct.

Bag A	Bag B	
$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{5} \neq \frac{1}{4}$
		so not the same [1]

Two bags each contain only red counters and yellow counters.

In Bag A, the ratio of red counters to yellow counters is 1 : 4.

In Bag B, $\frac{1}{4}$ of the counters are red.

$$\frac{1}{5} \text{ of } 20$$

$$\frac{1}{4} \text{ of } ?$$

(ii) The number of counters in the two bags is the same.

R13 Complete the table below to show how many counters of each colour could be in the bags.

Bag A

(20) Red Yellow

$\frac{1}{5}$ $\frac{4}{5}$

Bag B

(20) Red Yellow

$\frac{1}{4} = 5$ $\frac{3}{4} = 15$

$\frac{1}{5} \text{ of } 20 = 4$

$\frac{4}{5} \text{ of } 20 = 16$

	Red counters	Yellow counters
Bag A	4	16
Bag B	5	15

22 In a village the ratio of males to females is 2 : 1.

R13 40% of the people in the village are right-handed males.
25% of the people in the village are right-handed females.

Show that the proportion of females who are right-handed is greater than the proportion of males who are right-handed. **[6]**

22 In a village the ratio of males to females is 2:1. $\div 3$

3000

\rightarrow saying 3000

R13 40% of the people in the village are right-handed males.
25% of the people in the village are right-handed females.

Show that the proportion of females who are right-handed is greater than the proportion of males who are right-handed. [6]

$$\begin{array}{c} 3000 \\ \text{M} \\ 2 : 1 \\ \text{F} \\ 2000 : 1000 \end{array}$$

$$40\% \text{ of } 3000 = 1200$$

$$25\% \text{ of } 3000 = 750$$

Right Female

$$\frac{750}{1000} = \frac{75}{100}$$

Right Male

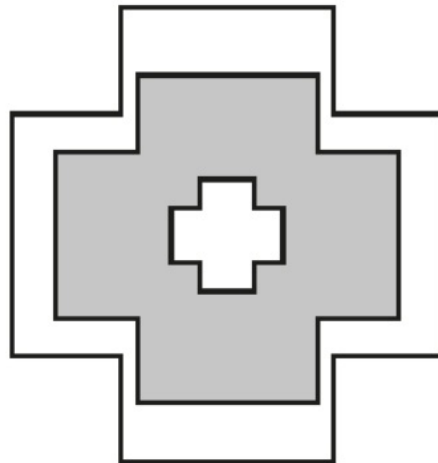
$$\frac{1200}{2000} = \frac{60}{100}$$

$$\frac{75}{100} > \frac{60}{100} \checkmark$$

- 17 The diagram consists of three mathematically similar shapes.
The heights of the shapes are in the ratio 1 : 4 : 5.

G56

R13



Not to scale

Find the ratio

total shaded area : total unshaded area.

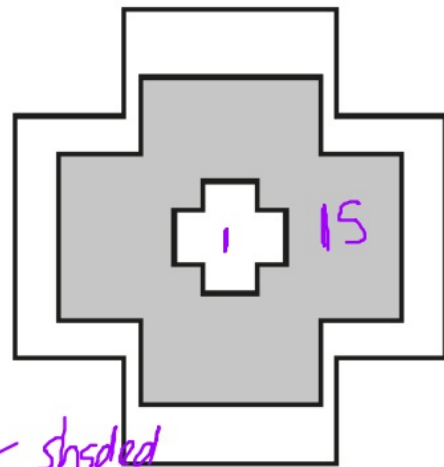
Give your answer in its simplest form.

total shaded area : total unshaded area : [4]

- 17 The diagram consists of three mathematically similar shapes.
The heights of the shapes are in the ratio 1 : 4 : 5.

G56

R13



Not to scale
L
x²
A

$$1 : 4 : 5$$

$$1^2 : 4^2 : 5^2$$

$$1 : 16 : 25$$

Area scale factors
= 1 : 16 : 25

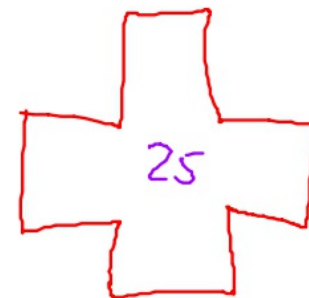
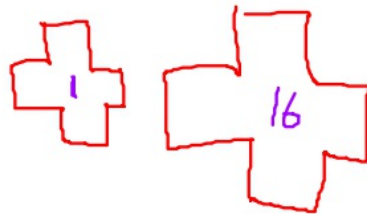
shaded
= 16 - 1

unshaded = Total - shaded
25 - 15 = 10

Find the ratio

total shaded area : total unshaded area.

Give your answer in its simplest form.



shaded : unshaded

15 : 10

3 : 2 ✓

total shaded area : total unshaded area 3 : 2 [4] ✓

Edexcel

5 Debra recorded the favourite colour of each of the 30 students in her class.

The incomplete table shows some information about her results.

(a) Complete the table for Debra's results.

Colour	Number of students
red	7
green	6
yellow	5
blue	10
other	

(b) What is the modal colour?

.....
(1)

Mark asked each student in a different class to name their favourite colour.

For this class,

the number of students who said blue is three times the number of students who said green.

(c) Write down the ratio of

the number of students who said blue to the number of students who said green.

.....
(1)

5 Debra recorded the favourite colour of each of the 30 students in her class.

The incomplete table shows some information about her results.

(a) Complete the table for Debra's results.

Colour	Number of students
red	7
green	6
yellow	5
blue	10
other	2

(b) What is the modal colour?
most
blue ✓

.....
(1)

Mark asked each student in a different class to name their favourite colour.

For this class,
the number of students who said blue is three times the number of students who said green.

(c) Write down the ratio of
the number of students who said blue to the number of students who said green.

B : G
3 : 1 ✓

.....
(1)

14 (a) Write $\pounds 4.20 : \pounds 1.40 : \pounds 7$ in its simplest form.

.....
(2)

(b) Write a number on the dotted line to complete the statement $6 : 4 = \dots : 1$

(1)

(Total for Question 14 is 3 marks)

14 (a) Write $\pounds 4.20 : \pounds 1.40 : \pounds 7$ in its simplest form.

$$\begin{array}{l} \times 5 \left(\begin{array}{l} 21 : 7 : 35 \\ \div 7 \downarrow \\ 3 : 1 : 5 \end{array} \right. \end{array}$$

$$3:1:5$$

(2)

(b) Write a number on the dotted line to complete the statement $6 : 4 = \dots : 1$

$$\div 4 \left(\begin{array}{l} 6 : 4 \\ 1.5 : 1 \end{array} \right) \div 4$$

(1)

(Total for Question 14 is 3 marks)

24 Only blue vans and white vans are made in a factory.

The ratio of the number of blue vans to the number of white vans is 4 : 3

(a) Write down the fraction of vans that are blue.

.....
(1)

For blue vans,

the number of small vans : the number of large vans = 3 : 5

(b) Work out the fraction of the number of vans made in the factory that are blue and large.

(3)

(Total for Question 6 is 4 marks)

6 Only blue vans and white vans are made in a factory.

The ratio of the number of blue vans to the number of white vans is 4 : 3

(a) Write down the fraction of vans that are blue.

$$\begin{array}{l} B : W \\ 4 : 3 \end{array}$$

$$\frac{4}{7}$$

(1)

For blue vans,

the number of small vans : the number of large vans = 3 : 5

(b) Work out the fraction of the number of vans made in the factory that are blue and large.

$$\begin{array}{l} \text{Blue} \\ S : L \\ 3 : 5 \\ \\ \frac{5}{8} \end{array}$$

$$\begin{array}{l} \frac{5}{8} \text{ of blue} \\ \frac{5}{8} \text{ of } \frac{4}{7} \\ \times \end{array}$$

$$= \frac{20}{56} \checkmark$$

(3)

(Total for Question 6 is 4 marks)

- 3 Rod **A** has length 12 cm.
Rod **B** has length 7 cm.

Write the length of rod **A** to the length of rod **B** as a ratio.

R13

.....
(Total for Question 3 is 1 mark)

- 3 Rod **A** has length 12 cm.
Rod **B** has length 7 cm.

Write the length of rod **A** to the length of rod **B** as a ratio.

R13

$$\begin{array}{l} A : B \\ 12 : 7 \end{array}$$

$$\underline{\underline{12 : 7}}$$

(Total for Question 3 is 1 mark)



9 (a) Write the ratio 21 : 14 in its simplest form.

R13

.....
(1)

There are some biscuits on a plate.

$\frac{1}{4}$ of the biscuits are chocolate.

The rest of the biscuits are plain.

(b) Write down the ratio of the number of chocolate biscuits to the number of plain biscuits.

R13

.....
(1)

The ratio of the number of boys to the number of girls in a class is 12 : 13

(c) What percentage of the class are boys?

R13

R5

.....%

(2)

9 (a) Write the ratio 21 : 14 in its simplest form.

R13

$$3:2$$

$$\frac{3:2}{(1)}$$

There are some biscuits on a plate.

$\frac{1}{4}$ of the biscuits are chocolate. $\frac{1}{4}$

The rest of the biscuits are plain. $\frac{3}{4}$

(b) Write down the ratio of the number of chocolate biscuits to the number of plain biscuits.

R13

$$\begin{array}{ccc} C & : & P \\ 1 & : & 3 \end{array}$$

$$\frac{1:3}{(1)}$$

B G

The ratio of the number of boys to the number of girls in a class is 12 : 13

(c) What percentage of the class are boys?

R13

R5

$$\text{fraction are boys} = \frac{12}{25} \quad \frac{48}{(2)}\%$$

$$\frac{12}{25} = 0.48 \times 100 = 48\%$$

Video created by W Neill

- 10** A farmer has 20 boxes of eggs.
There are 6 eggs in each box.

Write, as a ratio, the number of eggs in two boxes to the total number of eggs.
Give your answer in its simplest form.

.....

(Total for Question 10 is 2 marks)

- 10** A farmer has 20 boxes of eggs.
There are 6 eggs in each box.

Write, as a ratio, the number of eggs in two boxes to the total number of eggs.
Give your answer in its simplest form.

$$\frac{2 \text{ boxes}}{2 \times 6 \text{ eggs} = 12 \text{ eggs}}$$

$$\begin{array}{l} 12 : 120 \\ 1 : 10 \end{array}$$

$$\frac{20 \text{ boxes}}{20 \times 6 = 120 \text{ eggs}}$$

$$\underline{\quad\quad\quad} 1 : 10$$

(Total for Question 10 is 2 marks)

5 A path is made of white tiles and grey tiles.

$\frac{1}{4}$ of the tiles are white.

(a) Write down the ratio of white tiles to grey tiles.

Video created by W Neill

There is a total of 56 tiles.

(b) Work out the number of grey tiles.

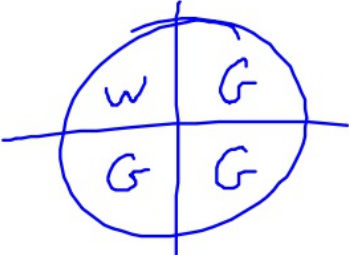
.....
(1)

.....
(2)

5 A path is made of white tiles and grey tiles.

$\frac{1}{4}$ of the tiles are white.

(a) Write down the ratio of white tiles to grey tiles.



add to 4 ✓

$$\begin{array}{r} w : G \\ 1 : 3 \\ \hline (1) \end{array}$$

There is a total of 56 tiles.

(b) Work out the number of grey tiles.

← 1 add 3

$\div 4$ $\left\{ \begin{array}{l} 56 \text{ tiles} = 4 \text{ parts} \\ 14 \text{ tiles} = 1 \text{ part} \end{array} \right.$
 $\times 3$ $\left\{ \begin{array}{l} 42 \text{ tiles} = 3 \text{ parts} \end{array} \right. \times 3$

$$\begin{array}{r} 42 \checkmark \\ \hline (2) \end{array}$$

- 11** There are 30 children in a nursery school.
At least 1 adult is needed for every 8 children in the nursery.
- (a) Work out the least number of adults needed in the nursery.

.....
(2)

2 more children join the nursery.

- (b) Does this mean that more adults are needed in the nursery?
You must give a reason for your answer.

.....
(1)

(Total for Question 11 is 3 marks)

- 11 There are 30 children in a nursery school.
At least 1 adult is needed for every 8 children in the nursery.

(a) Work out the least number of adults needed in the nursery.

$$A : C$$

$$1 : 8$$

$$2 : 16$$

$$3 : 24$$

$$4 : 32$$

Need 4 ✓

.....
(2)

2 more children join the nursery.

- (b) Does this mean that more adults are needed in the nursery?
You must give a reason for your answer.

No, as if 2 more are added the ratio will be 4:32

4 adults still needed

.....
(1)

(Total for Question 11 is 3 marks)

- 15** There are only red buttons, yellow buttons and orange buttons in a jar.
The number of red buttons, the number of yellow buttons and the number of orange buttons are in the ratio 7:4:9

Work out what percentage of the buttons in the jar are orange.

..... %

(Total for Question 15 is 2 marks)

- 15 There are only red buttons, yellow buttons and orange buttons in a jar.
The number of red buttons, the number of yellow buttons and the number of orange buttons are in the ratio 7:4:9

Work out what percentage of the buttons in the jar are orange.

$$\begin{array}{r} R : Y : O \\ 7 : 4 : 9 \end{array}$$
$$\begin{array}{r} \xrightarrow{\times 5} \\ \frac{9}{20} \qquad \frac{45}{100} \\ \xrightarrow{\times 5} \end{array}$$

.....45.....%

(Total for Question 15 is 2 marks)

6 Annie and Lily share some money in the ratio 4 : 3

(a) What fraction of the money does Lily get?

.....
(1)

Rosie and Dan share some sweets.

Dan gets $\frac{1}{4}$ of the sweets.

(b) Write down the ratio of the number of sweets Rosie gets to the number of sweets Dan gets

.....
(1)

A L

Created by W Neill

6 Annie and Lily share some money in the ratio 4 : 3

(a) What fraction of the money does Lily get?

$$\frac{3}{7}$$

(1)

Rosie and Dan share some sweets.

Dan gets $\frac{1}{4}$ of the sweets.

(b) Write down the ratio of the number of sweets Rosie gets to the number of sweets Dan gets

$$R : D$$
$$\frac{3}{4} : \frac{1}{4}$$

$$3 : 1$$

(1)

11 The table shows a cricket club's income in 2016 from a fete, a quiz and membership fees.

	Income	
Fete	£250	
Quiz	Entry fees	13 at £5 each
	Refreshments	£35
Membership fees	25 at £20 each	

Express as a ratio

the income from the fete to the income from the quiz to the income from membership fees.

Give your ratio in its simplest form.

.....
(Total for Question 11 is 3 marks)

11 The table shows a cricket club's income in 2016 from a fete, a quiz and membership fees.

		Income
Fete		£250
Quiz	Entry fees	13 at £5 each
	Refreshments	£35
Membership fees		25 at £20 each

$$\begin{array}{r} 13 \times 5 = £65 \\ + 35 \\ \hline £100 \end{array}$$

Express as a ratio

the income from the fete to the income from the quiz to the income from membership fees.

Give your ratio in its simplest form.

$$F : Q : MF$$

$$250 : 100 : 500$$

$$25 : 10 : 50$$

$$5 : 2 : 10$$

$$5 : 2 : 10$$

(Total for Question 11 is 3 marks)

19 There are only blue cubes, yellow cubes and green cubes in a bag.

There are

twice as many blue cubes as yellow cubes
and four times as many green cubes as blue cubes.

Hannah takes at random a cube from the bag.

Work out the probability that Hannah takes a yellow cube.

.....
(Total for Question 19 is 3 marks)

19 There are only blue cubes, yellow cubes and green cubes in a bag.

There are

twice as many blue cubes as yellow cubes
and four times as many green cubes as blue cubes.

Hannah takes at random a cube from the bag.

Work out the probability that Hannah takes a yellow cube.

<u>Attach number</u>	B	Y	G	
	8	4	32	$\frac{4}{44} = \frac{1}{11}$
	16	8	64	$\frac{1}{11}$
			$\frac{8}{88}$

(Total for Question 19 is 3 marks)

14 Gavin, Harry and Isabel each earn the same monthly salary.

Video created by W Neill

Each month,

N43/44/45

Gavin **saves** 28% of his salary and spends the rest of his salary

R13

Harry spends $\frac{3}{4}$ of his salary and **saves** the rest of his salary

the amount of salary Isabel saves : the amount of salary she spends = 3 : 7

Work out who saves the most of their salary each month.

You must show how you get your answer.

(Total for Question 14 is 4 marks)

14 Gavin, Harry and Isabel each earn the same monthly salary. £100

Video created by W Neill

Each month,

N43/44/45

Gavin saves 28% of his salary and spends the rest of his salary

R13

Harry spends $\frac{3}{4}$ of his salary and saves the rest of his salary

the amount of salary Isabel saves : the amount of salary she spends = 3 : 7

Work out who saves the most of their salary each month.

You must show how you get your answer.

G	H	I
28%	$\frac{1}{4}$	$\frac{3}{10}$
28%	25%	30%

£100
Gavin Saves 28% = £28

Harry Saves $\frac{1}{4}$ = £25

Isabel Saves 3 : 7
 $\frac{3}{10}$ $\frac{7}{10}$ $\frac{3}{10}$ of £100 = £30 ✓

Isabel saves most.

(Total for Question 14 is 4 marks)

17 There are some chocolates in a box.

R13 $\frac{1}{4}$ of the chocolates contain nuts.

The rest of the chocolates do not contain nuts.

Write down the ratio of the number of chocolates that contain nuts to the number of chocolates that do not contain nuts.

Give your answer in the form $1 : n$

(Total for Question 17 is 2 marks)

17 There are some chocolates in a box.

R13 $\frac{1}{4}$ of the chocolates contain nuts.

The rest of the chocolates do not contain nuts.

Write down the ratio of the number of chocolates that contain nuts to the number of chocolates that do not contain nuts.

Give your answer in the form $1 : n$

nuts : no nuts
 $\frac{1}{4}$ $\frac{3}{4}$

1 : 3

(Total for Question 17 is 2 marks)

23 Raya buys a van for £8500 plus VAT at 20%

R7 Raya pays a deposit for the van.

N13 She then pays the rest of the cost in 12 equal payments of £531.25 each month.

R13 Find the ratio of the deposit Raya pays to the total of the 12 equal payments.
Give your answer in its simplest form.

.....
(Total for Question 23 is 5 marks)

Raya buys a van for £8500 plus VAT at 20%

R7 Raya pays a deposit for the van.

N13 She then pays the rest of the cost in 12 equal payments of £531.25 each month.

R13 Find the ratio of the deposit Raya pays to the total of the 12 equal payments.

Give your answer in its simplest form.

Van cost	}	<u>12 payments</u>	}	<u>deposit</u>		
$£8500 + 20\%$		$£531.25 \times 12$		10200		dep : 17
$+ £1700$		$£6375 \checkmark$		$- 6375$	3825	$3825 : 6375$
$= £10200$					$3:5$	

(Total for Question is 5 marks)

16 Alan, Bispah and Chan share a sum of money.

R4a Alan gets $\frac{1}{8}$ of the money.

R4b Bispah gets $\frac{1}{2}$ of the money.

Chan gets the rest of the money.

Alan gets £2.50

(a) Work out how much money Bispah gets.

£.....
(2)

(b) Find the ratio
amount of money Alan gets : amount of money Chan gets

R13 Give your answer in the form $a:b$ where a and b are whole numbers.

.....
(3)

16 Alan, Bispah and Chan share a sum of money.

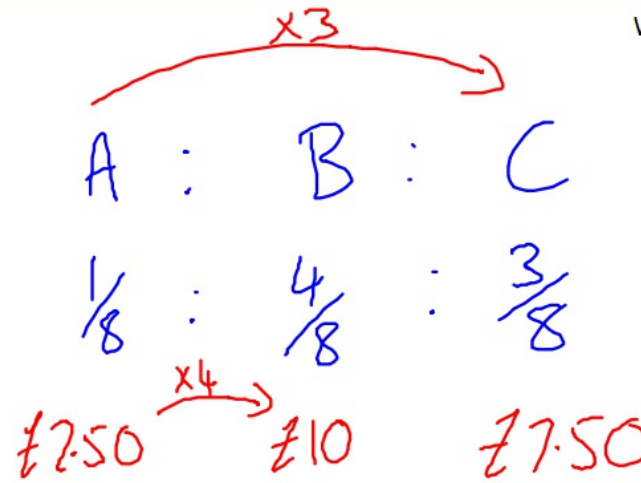
R4a Alan gets $\frac{1}{8}$ of the money.

R4b Bispah gets $\frac{1}{2}$ of the money.

Chan gets the rest of the money.

Alan gets £2.50

(a) Work out how much money Bispah gets.



$\frac{1}{2} = \frac{4}{8}$

£ 10
(2)

(b) Find the ratio
amount of money Alan gets : amount of money Chan gets

R13 Give your answer in the form $a:b$ where a and b are whole numbers.

$2.50 : 7.50$
 $1 : 3 \checkmark$

.....
(3)

13 Azmol, Ryan and Kim each played a game.

R13 Azmol's score was four times Ryan's score.
Kim's score was half of Azmol's score.

Write down the ratio of Azmol's score to Ryan's score to Kim's score.

.....
(Total for Question 13 is 2 marks)

13 Azmol, Ryan and Kim each played a game.

R13 Azmol's score was four times Ryan's score.
Kim's score was half of Azmol's score.

Write down the ratio of Azmol's score to Ryan's score to Kim's score.

$$\begin{array}{l} A : R : K \\ 12 : 3 : 6 \\ \checkmark 4 : 1 : 2 \end{array} \quad \begin{array}{l} \div 3 \\ \hline 4 : 1 : 2 \end{array}$$

(Total for Question 13 is 2 marks)

- 16** Write down the ratio of 450 grams to 15 grams.
Give your answer in its simplest form.
- R13**

.....

(Total for Question 16 is 2 marks)

- 16 Write down the ratio of 450 grams to 15 grams.
Give your answer in its simplest form.

R13

$$\begin{array}{l} 450 : 15 \\ 30 : 1 \\ \checkmark \end{array}$$

$$30 : 1$$

(Total for Question 16 is 2 marks)

17 $x^2 - 9y^2 = 0$ where $x > 0$ and $y > 0$

(a) Work out the ratio $x : y$

17 $x^2 - 9y^2 = 0$ where $x > 0$ and $y > 0$

(a) Work out the ratio $x : y$

$$(x + 3y)(x - 3y) = 0$$

~~$x = -3y$~~ or $x = 3y$ ✓

$$x : y$$

$$3 : 1$$

11 Anna and Bill share some money in the ratio 2 : 5

Anna gets £ A

Bill gets £ B

Carl and Donna share twice as much money as Anna and Bill share.

They share the money in the ratio 3 : 1

Carl gets £ C

Donna gets £ D

Find $A : B : C : D$

Give your answer in its simplest form.

.....
(Total for Question 11 is 3 marks)

11 Anna and Bill share some money in the ratio 2 : 5

Anna gets £A

Bill gets £B

Carl and Donna share twice as much money as Anna and Bill share.

They share the money in the ratio 3 : 1

Carl gets £C

Donna gets £D

Find $A : B : C : D$

Give your answer in its simplest form. x2

$$11x = 4 \text{ parts}$$

$$3.5x = 1 \text{ part}$$

$$\begin{array}{cccc}
 A & : & B & : & C & : & D \\
 2x & & 5x & & 10.5x & & 3.5x \\
 \hline
 & & 7x & & & & 14x
 \end{array}$$

$$\begin{array}{cccc}
 A & : & B & : & C & : & D \\
 4x & & 10x & & 21x & & 7x \\
 \hline
 & & & & 4 & : & 10 & : & 21 & : & 7
 \end{array}$$

(Total for Question 11 is 3 marks)

AQA

15 In a school show,

R13

girls : boys = 1 : 1

girls who sing : girls who do not sing = 1 : 2

8 girls **sing** in the show.

How many students are in the show altogether?

[3 marks]

Answer _____

15

R13

In a school show,

girls : boys = $\overset{24}{1} : \overset{24}{1}$

girls who sing : girls who do not sing = 1 : 2

8 girls **sing** in the show.

How many students are in the show altogether?

[3 marks]

Girls Sing : Girls not sing

1 : 2

8 : 16 = Total = 24 girls

Answer Total students = 48 ✓

16

R13

The counters in a bag are red or blue.

One fifth of the counters are red.

Work out the ratio red counters : blue counters

Circle your answer.

[1 mark]

1 : 4

1 : 5

4 : 5

1 : 6

16

R13

The counters in a bag are red or blue.

One fifth of the counters are red.

Work out the ratio red counters : blue counters

Circle your answer.

$$\frac{1}{5} : \frac{4}{5}$$

$\xrightarrow{\times 4}$

$$1 : 4$$

$1 : 5$

$4 : 5$

$1 : 6$

$$R : B$$
$$\frac{1}{5} : \frac{4}{5}$$

$\xrightarrow{\times 4}$

[1 mark]

19 Ben and Katy throw darts at a target.

R13

Ben's ratio of hits to misses is 5 : 1

Katy's ratio of hits to misses is 3 : 1

Ben says,

"5 is bigger than 3, so I must have more hits than Katy."

Give an example to show that this might **not** be true.

[2 marks]

19 Ben and Katy throw darts at a target.

R13

Ben's ratio of hits to misses is 5 : 1
Katy's ratio of hits to misses is 3 : 1

Ben says,
"5 is bigger than 3, so I must have more hits than Katy."

$20 \div 4 = 5$

Give an example to show that this might not be true.

Ben (12 goes)
hits : misses
5 : 1
10 hits : 2 misses

Katy 20 goes
hits : misses
3 : 1
15 hits : 5 misses

[2 marks]

Reason
You do not know how many goes each have had

11 (a) Cards in a pack are red or blue in the ratio

R13

$$\text{red : blue} = 2 : 3$$

What fraction of the cards are **red**?

Circle your answer.

[1 mark]

$$\frac{5}{6}$$

$$\frac{2}{3}$$

$$\frac{2}{5}$$

$$\frac{3}{5}$$

11 (a) Cards in a pack are red or blue in the ratio

R13

$$\text{red : blue} = 2 : 3$$

What fraction of the cards are red?
Circle your answer.

$$\frac{2}{5}$$

[1 mark]

$$\frac{5}{6}$$

$$\frac{2}{3}$$

$$\frac{2}{5}$$

$$\frac{3}{5}$$

18 Circle the ratio which is the same as the scale 1 cm represents 1 km

[1 mark]

R1
R13

1 : 100

1 : 1000

1 : 10 000

1 : 100 000

18 Circle the ratio which is the same as the scale 1 cm represents 1 km

100000 cm

[1 mark]

R1

R13

1 : 100

1 : 1000

1 : 10 000

1 : 100 000

$$100\text{cm} = 1\text{m}$$

$$1\text{km} = 1000\text{m}$$

$$1000\text{m} = 100000\text{cm}$$

22

Anna plays a computer game.

Each game is a win or a loss.

R4a

She wins three quarters of her first 24 games.

R13

She then wins her next 12 games.

For all 36 games, work out the ratio wins : losses

Give your answer in its simplest form.

[3 marks]

Answer _____ : _____

22

Anna plays a computer game.

Each game is a win or a loss.

R4a

She wins three quarters of her first 24 games.

R13

She then wins her next 12 games.

For all 36 games, work out the ratio wins : losses

Give your answer in its simplest form.

[3 marks]

Plays 36

Wins $\frac{3}{4}$ of 24

$$\frac{24}{4} = 6 \times 3 = 18$$

$$\begin{array}{r} 18 \\ + 12 \\ \hline 30 \text{ wins} \end{array}$$

wins : losses

$$30 : 6$$

$$5 : 1$$

$$\div 6$$

5

1

Answer 5 : 1

20 $a : b = 5 : 2$

R13 How many times larger is a than b ?

R14 Circle your answer.

[1 mark]

0.4

1.5

2.5

3

20 $a : b = 5 : 2$

R13 How many times larger is a than b ?

R14 Circle your answer.

[1 mark]

0.4

1.5

2.5

3

$$a : b$$

$$5 : 2$$

$\times 2.5$

26 Theo starts with savings of £18
James starts with no savings.

R13

Each week from now,

Theo will save £4.50 and James will save £4

In how many weeks will Theo and James have savings in the ratio 15 : 8 ?

[3 marks]

Answer _____

26 Theo starts with savings of £18
James starts with no savings.

R13

Each week from now,

Theo will save £4.50 and James will save £4

In how many weeks will Theo and James have savings in the ratio 15 : 8 ?

[3 marks]

Answer _____

19 A forest has 6500 trees.

The trees are beech or maple.

number of beech : number of maple = 1.6 : 1

19 (a) What fraction of the trees are beech?

[2 marks]

R13

Answer _____

19 A forest has 6500 trees.

The trees are beech or maple.

$$\begin{array}{c} B \quad M \\ \text{number of beech : number of maple} = 1.6 : 1 = 2.6 \end{array}$$

19 (a) What fraction of the trees are beech?

[2 marks]

R13

$$\frac{1.6}{2.6}$$

Answer

$$\frac{8}{13}$$

4 $a : b = 4 : 3$

R13 Circle the correct statement.

[1 mark]

b is $\frac{4}{7}$ of a

b is $\frac{3}{7}$ of a

b is $\frac{4}{3}$ of a

b is $\frac{3}{4}$ of a

4 $a : b = 4 : 3$

R13 Circle the correct statement.

[1 mark]

b is $\frac{4}{7}$ of a

b is $\frac{3}{7}$ of a

b is $\frac{4}{3}$ of a

b is $\frac{3}{4}$ of a

$$a : b \\ 4 : 3$$

$$\frac{3}{4} \text{ of } 4 = 3$$

17

P is a rectangle with length 50 cm and width x cm

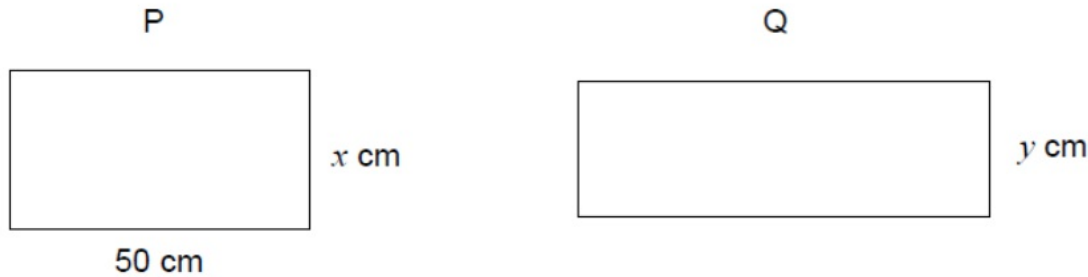
Video created by W Neill

A16

R13

Q is a rectangle with width y cm

Not drawn
accurately



The length of Q is 20% **more** than the length of P.

The area of Q is 10% **less** than the area of P.

Work out the ratio $x : y$

Give your answer in its simplest form.

[4 marks]

Answer _____ : _____

17

P is a rectangle with length 50 cm and width x cm

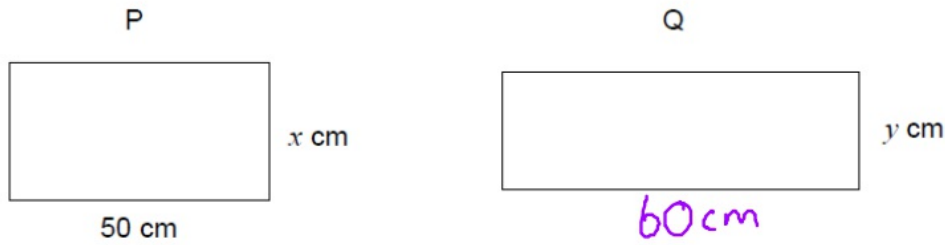
Q is a rectangle with width y cm

Video created by W Neill

A16

R13

Not drawn accurately



The length of Q is 20% more than the length of P.

The area of Q is 10% less than the area of P.

Work out the ratio $x : y$

Give your answer in its simplest form.

20% of 50 = 10

$$\text{Area P} = \text{Area Q}$$

$$50x \times 0.9 = 60y$$

$$45x = 60y$$

$$3x = 4y$$

[4 marks]

12	12
24	24

$$8:6$$

$$4:3$$

$$4 : 3 \checkmark$$

Answer _____ : _____

2 y is 100% **more** than x .

Circle the ratio $x : y$

R13

[1 mark]

1 : 100

100 : 1

1 : 2

2 : 1

2 y is 100% more than x .

Circle the ratio $x : y$

R13

[1 mark]

1 : 100

100 : 1

1 : 2

2 : 1

$$100\% \text{ of } 20 = 20$$

$$x = 20$$

$$y = 40$$

$$x : y$$

$$20 : 40$$

$$1 : 2$$

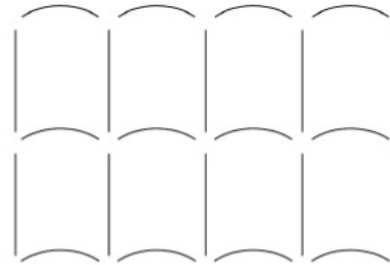
14 Patterns are made using straight lines and arcs.

14 (a)

Pattern A (one row)

Pattern B (two rows)

R13



More rows are added to **Pattern B** so that

$$\text{number of straight lines} : \text{number of arcs} = 10 : 9$$

How many rows are added?

[2 marks]

Answer _____

14 Patterns are made using straight lines and arcs.

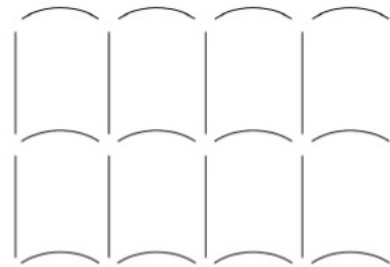
Video created by W Neill

14 (a)

Pattern A (one row)

Pattern B (two rows)

R13



More rows are added to **Pattern B** so that

number of straight lines : number of arcs = 10 : 9

How many rows are added?

$$\begin{array}{l} \div 4 \quad \left(\begin{array}{l} 40 : 36 \\ 10 : 9 \end{array} \right) \div 4 \end{array}$$

SL : ARCS

5 : 8

10 : 12

15 : 16

20 : 20

25 : 24

[2 marks] 30 : 28

35 : 32

✓ 40 : 36

Answer

6 ✓

16 The value of y is 20% more than the value of x .

R7 Circle the ratio $x : y$

R13

[1 mark]

5 : 6

6 : 5

4 : 5

5 : 4

16 The value of y is 20% more than the value of x .

20% of 5 = 1

R7 Circle the ratio $x : y$

[1 mark]

R13

5 : 6

6 : 5

4 : 5

5 : 4

20% more

$$x = 100$$

$$y = 120$$

$$x = y$$

$$100 = 120$$

$$10 : 12$$

$$5 : 6$$

- 26** b is two thirds of c .
 $5a = 4c$
- R13** Work out the ratio $a : b : c$
Give your answer in its simplest form where a , b and c are integers.

[3 marks]

Answer _____ : _____ : _____

26 b is two thirds of c .

$$5a = 4c$$

R13

Work out the ratio $a : b : c$

Give your answer in its simplest form where a , b and c are integers.

$$\frac{2}{3} \text{ of } 15 = 10$$

[3 marks]

$$5a = 4c$$

$$a=4 \quad c=5$$

$$20 = 20$$

$$a : b : c$$

$$4 : \quad : 5$$

$$12 : 10 : 15$$



Answer 12 : 10 : 15

3

y is $1\frac{1}{2}$ times x .

R13

Circle the ratio that is equivalent to $y : x$

2 : 5

5 : 2

3 : 2

2 : 3

[1 mark]

3

y is $1\frac{1}{2}$ times x .

R13

Circle the ratio that is equivalent to $y : x$

[1 mark]

2 : 5

5 : 2

3 : 2

2 : 3

$y : x$

3 : 2

$x \times \frac{1}{2}$ ✓