Q1.

Solve this equation.

$$7y + 12 = 5y + 40$$

Show your method

$y =$

Q2.

n and p stand for two numbers.

n is a multiple of 5
p is a multiple of 6

$$\frac{n}{p} = \frac{2}{3}$$

Find numbers that n and p stand for.

Show
your
method

$n =$

$p =$

2 marks

Q3.

In a survey of children's favourite fruit juices, these were the results.

Juice	Apple	Orange	Grape	Mango
Percentage of children	25%	14%	30%	31%

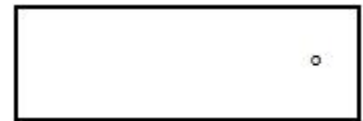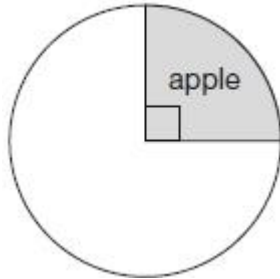(a) **20 more** children chose grape than chose apple.

How many children took part in the survey?

Show
your
method

children

(b)   Chen makes a pie chart to show the results.

What **angle** should he use for the children who chose **mango**?

1 mark

Q4.

Write the missing number.

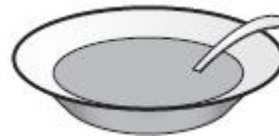$$12.5 \div \boxed{} = 7.5 \div 1.5$$

1 mark

Q5.

Alfie did a survey to find which soup was most popular.

The choices were:

- tomato
- chicken
- mushroom

A quarter of the children chose chicken soup.

Four times as many children chose tomato soup as chose mushroom soup.

Alfie makes a pie chart to show this information.

What **angle** should he use for the children who chose tomato soup?
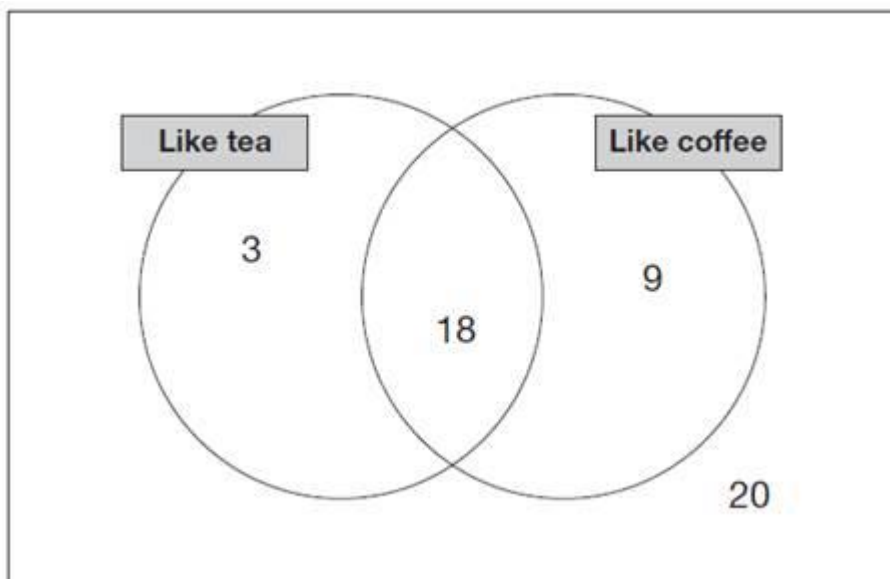
3 marks

Q6.

In a survey people were asked if they like tea and coffee.

The results are in this Venn diagram.

Like tea

Like coffee

3

9

18

20

(a)   What **percentage** of people in the survey like **both** tea and coffee?
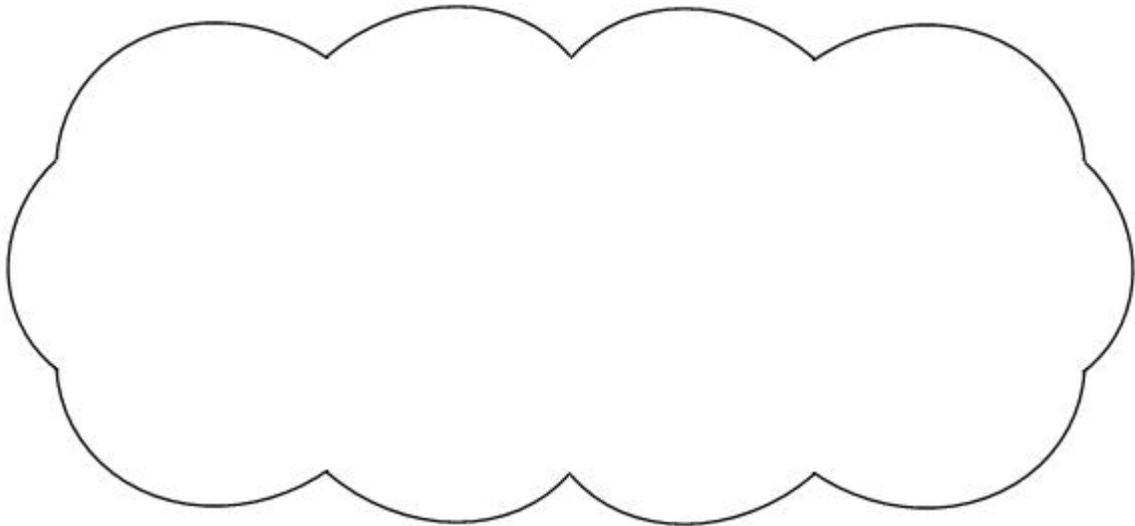
1 mark

(b)   What **percentage** of people in the survey do **not** like coffee?

| | % |

1 mark

Q7.

Anna says $\dfrac{4}{7}$ is greater than $\dfrac{5}{9}$
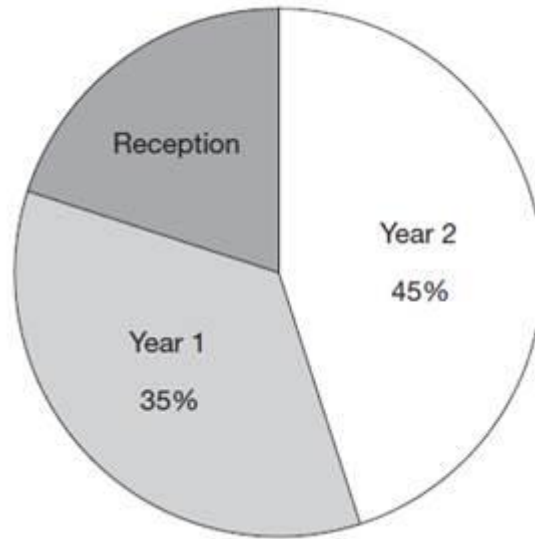
Explain why Anna is correct.

1 mark

Q8.

The pie chart shows the Year groups of children at Woodland Infant School.

There are **56** children in **Year 1**.

How many children are there in Reception?

Show your method

| | children |

<div align="right">2 marks</div>

Q9.

What is 10% of a half?

What percentage of 20 is 19?
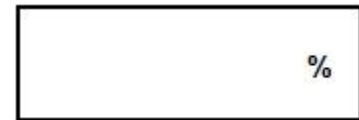
Q10.

Here is a sequence of shapes.

Each time a square is added to a shape,
two more circles are added.
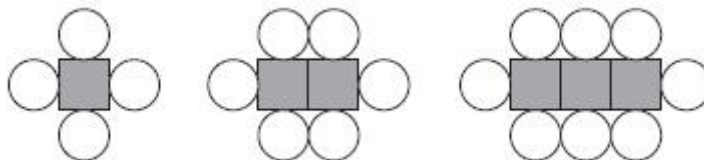
number of squares, s	1	2	3
number of circles, c	4	6	8

The sequence of shapes continues.

The formula for the sequence is $c = 2s + 2$

Calculate the number of circles when the
number of squares in a shape is **150**.

circles

How many squares are there in a shape that has **100** circles?

squares

2 marks

Q11.

In this circle, each shaded part is $\frac{1}{5}$ of the area of the circle.

The two white parts have equal areas.
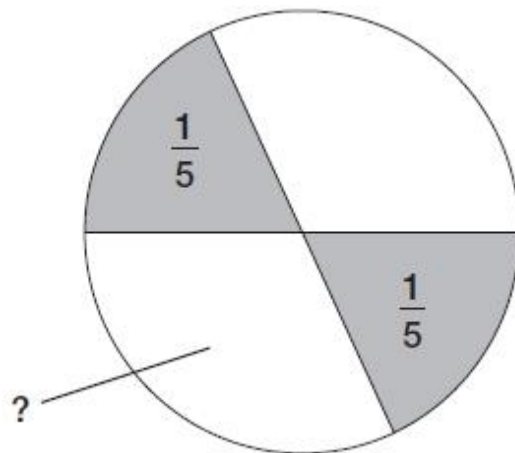
Not drawn accurately

What fraction of the circle is **one** of the white areas?

2 marks

Q12.

A shop makes **100** sandwiches.

All the sandwiches are either cheese or tuna.

Some of the sandwiches also have salad with the cheese or tuna.

30 sandwiches have cheese with salad.

15 sandwiches have tuna without salad.

75 sandwiches have salad.

How many sandwiches have cheese without salad?

2 marks

Q13.

This photograph shows three Russian dolls.

The real-life height of the **largest** Russian doll is **13.5 cm.**

What is the real-life height of the **smallest** Russian doll?

	cm

2 marks

Q14.

Solve this equation to find the value of y.

$$8(y + 12) = 100$$

Show your method

$y =$

2 marks

Q15.

Chen chooses a **prime** number.

He multiplies it by 10 and then rounds it to the nearest hundred.

His answer is **400**.

Write **all** the possible prime numbers Chen could have chosen.

_____

2 marks

Q16.

Alfie asks some boys and girls about their favourite hobby.

He shows the results on a graph.
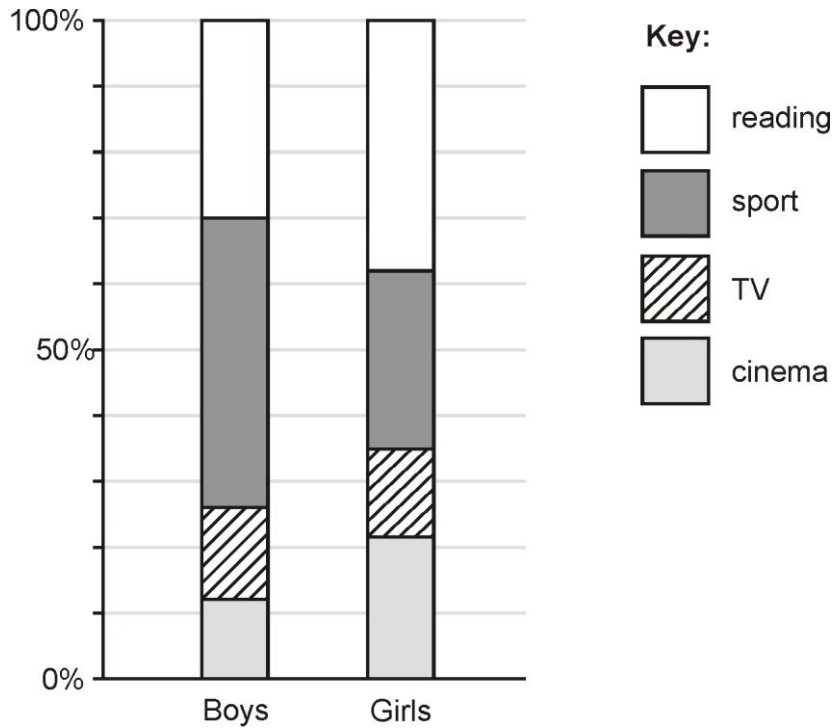
The graph shows that **44%** of boys chose sport.

Estimate the percentage of **girls** who chose sport.

```
                                              %
```

1 mark

120 boys chose reading.

Estimate the **number** of boys who chose **cinema**.

```
                                           boys
```

1 mark

Q17.

Megan goes on a walking holiday for five days.

The table shows how far she walked on the first four days.

Monday	Tuesday	Wednesday	Thursday
14 km	23 km	13 km	13 km

Megan says,

> *'My average for the first four days is more than 15 km.'*

Explain why Megan is **correct**.
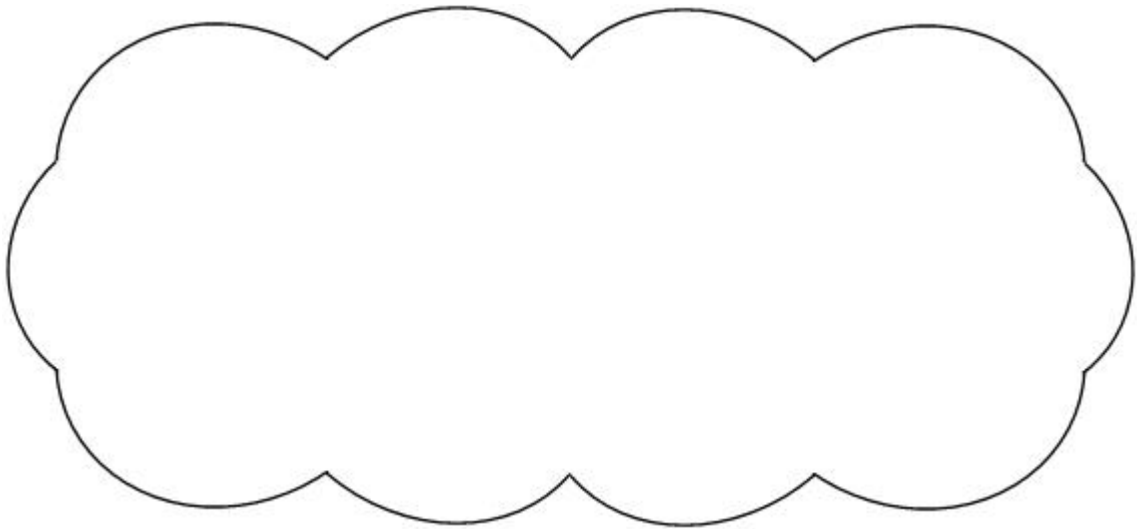
1 mark

Friday is her last day.

She wants to increase her average to **17 km**.

How many kilometres must she walk on Friday?

Show your method

kg

2 marks

Q18.

Here is a trapezium with a height of 10 centimetres.
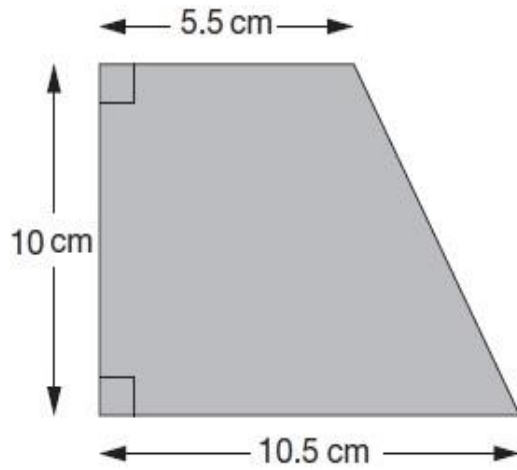
The parallel sides are 5.5 cm long and 10.5 cm long.

Find the **area** of the trapezium.

Show your method

cm²

2 marks

Q19.

Runa and Jon each start with the same number.

Runa rounds the number to the nearest hundred.

Jon rounds the number to the nearest ten.

Runa's answer is double Jon's answer.

Explain how this can be.
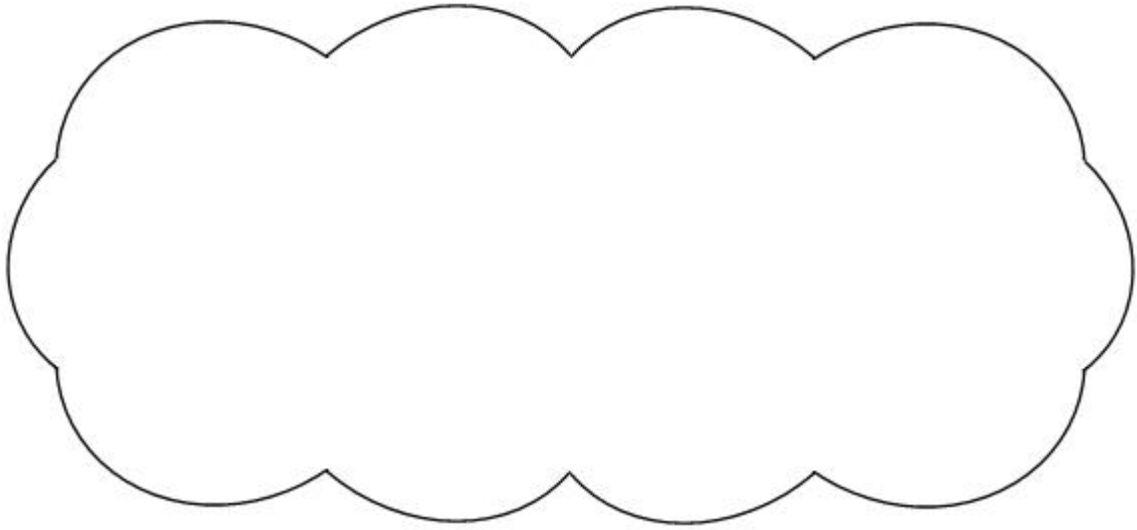
Q20.

Look at this expression.

$$10y + 2$$

When $y = 0.4$, the value of $10y + 2$ is an **even** number because $10 \times 0.4 + 2 = 6$

Write a value for y so that $10y + 2$ is a **prime** number.

$$y =$$

1 mark

Now write a value for y so that $10y + 2$ is a **square** number.

$$y =$$

1 mark

Q21.

Look at this information.

Tom was born in **1988**
Ben was born in **2000**

Tom and Ben have the **same birthday**.

The ratio of Tom's age to Ben's age on their birthday in **2001** was **13 : 1**.

What was the ratio of Tom's age to Ben's age on their birthday in **2003**?

Write the ratio in its **simplest form**.

:

1 mark

In what year was the ratio of Tom's age to Ben's age **3 : 1**?

Show
your
method

2 marks

Q22.

The factors of 11 sum to 12

Write the other number whose factors sum to 12

Q23.

The box below shows **all** the possible values for x.

x is a whole number.

$$40 < x < 45$$

x could be _41, 42, 43 or 44_

Write **all** the possible values for k.

k is a whole number.

$$29 < 2k < 35$$

k could be

_____

Write **all** the possible values for w.

w is a whole number.

$$18 < 3w + 1 < 24$$

w could be

_____

3 marks

Q24.

Look at these equations.

$$a = 2b$$

$$b = 3c$$

Which equation below is also true?

Put a ring round the correct one.

$b = 2a$ $a = 2b + 3c$ $a = 5c$

$a = 6c$ $a + b = 5$

1 mark

Q25.

This square is divided into three parts.
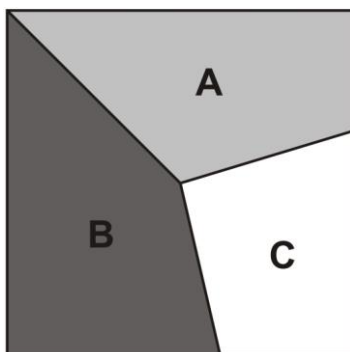
Part **A** is $\frac{1}{3}$ of the area of the square.

Part **B** is $\frac{2}{5}$ of the area of the square.

What fraction of the area of the square is part **C**?

2 marks

Q26.

Paulo makes a sequence of numbers.

He chooses a starting number and then subtracts equal amounts each time.

The **third number** in his sequence is **45**

The **tenth number** is **–32**

		45							–32

What is the **first** number in the sequence?

2 marks

Q27.

150 people take part in a walk.

This chart shows the number of people still walking at different times.
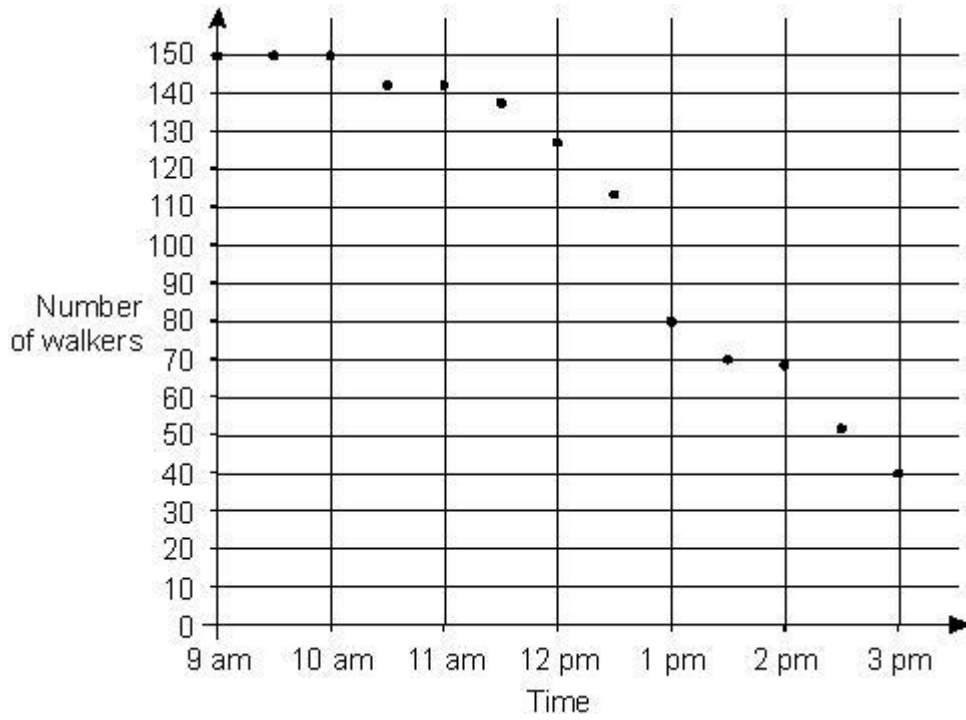
Use the chart to estimate the **time** when **two-thirds of the people** are still on the walk.

1 mark

What **percentage** of the people who started are **still on the walk at 3pm**?

Show your method

%

2 marks

Q28.

Find the value of t in this equation.

$$33 - 8t = 15$$

2 marks

Q29.

Here is a sequence of shapes made from squares and circles.

shape number (n)	1	2	3	4
number of circles (c)	2	5	8	11
number of squares (s)	3	5	7	9

The sequence continues in the same way.

The formula for the **number of circles (c)**
 n **shape number (n)** is

$$c = 3n - 1$$

Use the formula to work out the **shape number** which has **104 circles**.

2 marks

Write the formula for the **number of squares (s)** in **shape number (n)**.

S = _____

1 mark

Q30.

Circle the two decimals which are **closest in value** to each other.

0.9   0.09   0.99   0.1   0.01

1 mark

Q31.
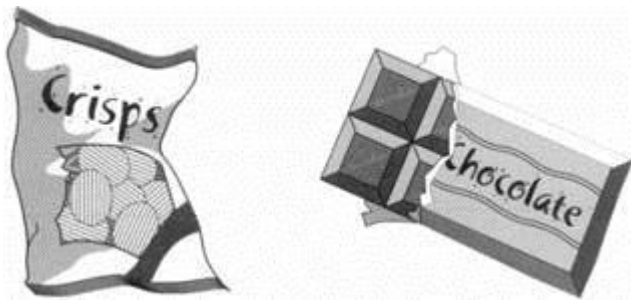
In Class 6, **80%** of the children like crisps.

75% of the children **who like crisps** also like chocolate.

In Class 6, what percentage of the children like **both** crisps and chocolate?

%

2 marks

Q32.

Lili and Julian each start with the **same** number.

Lili works out **half of the number**.

Julian works out **three-quarters of the number**.

The **sum** of their answers is **275**

What was the number they started with?

2 marks

Q33.

A, B and C stand for three different numbers.

The mean of A and B is 40

The mean of B and C is 35

A + B + C = 100

Calculate the values of **A**, **B** and **C**.

Show
your
method

A =

B =

C =

2 marks

Q34.

Draw a line from each of the expressions on the left to an equivalent expression on the right.

12

w + 12

(w + 5) + (w − 7)

−2

2w + 12

(w + 5) − (w + 7)

w − 2

2w − 2

2 marks

Q35.

Write **two decimals, each less than 1**, which multiply to make **0.1**

[ ] × [ ] = 0.1

1 mark

Mark schemes

Q1.

14

> *!   Algebra*
> *See guidance*

2

or

Shows or implies a correct first step of algebraic manipulation that either reduces the number of terms or collects variables on one side of the equation and numbers on the other, eg:

- $2y + 12 = 40$

- $7y = 5y + 28$

- $7y - 5y = 40 - 12$

- $2y = 28$

- $28 \div 2$

> *!   Condone correct embedded solutions*
> *Award 1 mark, for a response which shows 14 as the embedded solution to their working, eg:*
> - *$7y + 12 = 5y + 40$*
>   *$(7 \times 14) + 12 = (5 \times 14) + 40$*
>   *$110 = 110$*

1

[2]

Q2.

Award marks as shown below for values of *n* and *p* which meet the following criteria:

	n:p	
	2:3	**3:2**
n is multiple of **5** **and** ***p*** is multiple of **6**	2 marks [A]	1 mark [C]
n is multiple of **5** **or** ***p*** is multiple of **6**	1 mark [B]	0 marks

The following examples are worth 2 marks:

- $n = 20$ **and** $p = 30$ [A]

- $n = 80$ **and** $p = 120$ [A]

> *! For 2m or 1m, accept multiple answers provided all meet the requirements for the mark(s) and are clearly distinguishable as separate answers, eg for 2 marks*
>
> - $n = 20, 40, 60$
> $p = 30, 60, 90$

2

or

The following examples are worth 1 mark:

- $n = 5$ and $p = 7.5$ [B]

- $n = 10$ and $p = 15$ [B]

- $n = 4$ and $p = 6$ [B]

- $n = 90$ and $p = 60$ [C]

OR

Shows or implies a method for rearranging $\dfrac{n}{p} = \dfrac{2}{3}$ which moves p from the denominator, eg:

- $3n = 2p$

- $n = \dfrac{2p}{3}$

OR

Shows or implies a complete correct method, eg:

- $2 \times 5 \times 6 \ : \ 3 \times 5 \times 6$

> *! For 1m, condone a list of at least five additional ratios or fractions equivalent to $\dfrac{2}{3}$ with none incorrect*

1

[2]

Q3.

(a)   400

2

or

Shows or implies a complete correct method, eg:

- $30\% - 25\% = 5\%$

  $5\% = 20$

  $100\% = 20 \times 20$

(b)   111.6 **or** 112

              Do not accept *111*

              [3]

Q4.

2.5

      Accept equivalent fractions or decimals

              [1]

Q5.

216

or

54 seen *(angle for mushroom soup)*

OR

Shows or implies a correct method for tomato soup with not more than one computational error, eg:

-    360 − 90 = 240 *(error)*
  240 ÷ 5 = 48
  48 × 4 = 192

-    0.6 × 360

-    25% = chicken
  75% ÷ 5 = 15%
  15% of 360° = 54°
  54° × 4

or

Shows the angle representing tomato soup and mushroom soup is 270

OR

60% **or** $\dfrac{3}{5}$ seen (*as evidence of a correct method* for tomato soup)

OR

Shows or implies a correct method for finding the angle required to represent mushroom soup, eg:

-    360° − 90° = 260° *(error)*
  260° ÷ 5 = 40° *(error)*

OR

Shows or implies a correct method for tomato soup with more than one computational error, eg:

- 360° − 90° = 240° *(error)*
  240° × 4 ÷ 5 = 200° *(error)*

> ***Do not accept*** *tomato soup is 270°*
>
> ***Do not accept*** *methods involving drawings of pie charts, without any values given*
>
> *Accept equivalent fractions or decimals, eg:*
>
> - $\dfrac{6}{10}$
> - *0.6*
>
> ***Do not accept*** *60 or 60° for 60%*

1

[3]

Q6.

(a) 36

> ***Do not accept*** *equivalent fractions or decimals*

1

(b) 46

> ***Do not accept*** *equivalent fractions or decimals*

1

[2]

Q7.

Gives a correct explanation that converts the given fractions to decimals **or** fractions with a common denominator / numerator **or** percentages, eg:

- $\dfrac{4}{7} = \dfrac{36}{63}$ but $\dfrac{5}{9} = \dfrac{35}{63}$

- 0.57142… > 0.55555

- Because there is a $\dfrac{1}{63}$ difference between the two

> *For* $\dfrac{4}{7}$ *accept:*
> - *0.57(...)* **or** *57(. ...%)*
>
> *For* $\dfrac{5}{9}$ *accept:*
> - *0.56* **or** *0.55(...)* **or** *56(%)* **or** *55(. ...%)*
>
> *Accept minimally acceptable explanations, eg:*
> - $\dfrac{36}{63}$ $\dfrac{35}{63}$
> - *0.56   0.57*

Do not accept incomplete explanations that fail to convert both fractions to a common format, eg:

- $\frac{4}{7}$ *is 0.57 so it is bigger*
- *9ths are smaller than 7ths and there is only one more 9th than 7th so* $\frac{4}{7}$ *is greater*

! Condone method of conversion incorrectly expressed in an otherwise correct explanation, eg:

- $\frac{4}{7} \times 9 = \frac{36}{63}$

[1]

Q8.

32

2

or

160 seen *(the total children in the school)*

   Do not accept 160° or 160%

OR

Shows or implies a complete, correct method, eg:

- 35 + 45 = 90 *(error)*
  100 − 90 = 10
  56 ÷ 35 = 1.6
  1.6 × 10 = 16

- 35% of children = 56
  total children = 56 × 100 ÷ 35 = 150 *(error)*
  Reception = 100 − (45 + 35)% = 20%
  Reception = 20% of 150
  0.2 × 150 = 40 *(error)*

- 35% is 56
  5% is 8
  20% is 4 × 8 = 24 *(error)*

1

[2]

Q9.

(a) $\frac{1}{20}$ or equivalent

   Accept equivalent fractions, decimals or percentages, eg:

- *5%*
- *0.05*
- $\dfrac{5}{100}$

Do not accept *5 without a percentage sign*

1

(b)   95

Do not accept *equivalent fractions or decimals*

1

[2]

Q10.

(a)   302

1

(b)   49

2

or

Shows or implies a correct first step of algebraic manipulation that either reduces the number of terms **or** collects variables on one side of the equation and numbers on the other, eg:

- $2s = 100 - 2$

- $s = 98 \div 2$

    ! Correct embedded solutions
    Award 1 for a response which shows
    49 as the embedded solution to their working

OR

Shows or implies a complete correct method, eg:

- $(100 - 2) \div 2$

1

[3]

Q11.

$\dfrac{3}{10}$ or equivalent

Accept equivalent fractions, decimals or percentages

2

or

Shows or implies a complete correct method and no conceptual errors, eg:

- Shaded fraction is $\dfrac{1}{5} + \dfrac{1}{5} = \dfrac{2}{5}$

Fraction of total white area = $1 - \dfrac{2}{5} = \dfrac{3}{5}$

$\dfrac{3}{5} \div 2$

- $\dfrac{1}{5} + \dfrac{1}{5}$ = 20% + 20% = 30% *(error)*

White area = 70%

Each white area = 35%

> *! 30 with no % sign*
> *Accept for 1m as evidence of a correct method*
>
> *!* $\dfrac{1.5}{5}$ *or* $\dfrac{1\frac{1}{2}}{5}$
>
> *Accept for 1 as evidence of a correct method*
> *(incorrect notation for* $\dfrac{3}{5} \div 2$*)*
>
> ***Do not accept*** *conceptual errors seen, eg:*
>
> - $\dfrac{1}{5} + \dfrac{1}{5} = \dfrac{2}{10}$
> - $\dfrac{1}{5} + \dfrac{1}{5}$ *= 5% + 5% = 10%*
> - $\dfrac{6}{10} \div 2 = \dfrac{3}{5}$

1

[2]

Q12.

10

2

or

Shows or implies a complete correct method, eg:

- 100 – (15 + 75)

- No salad, 100 − 75 = 35 *(error)*
  Cheese without salad, 35 – 15

- Tuna with salad, 75 – 30 = 45
  Tuna, 45 + 15 = 55 *(error)*
  Cheese, 100 – 55 = 45
  Cheese without salad, 45 – 30 = 5 (*error*)

-

	salad	no	

		salad	
cheese	30	*error*	
tuna	45	15	
	75	25	100

1

[2]

Q13.

9.6 or equivalent, eg:

•   9.60

> *! Measures*

2

or

Shows or implies the correct scale factor, eg:

•   ×3 seen

•   13.5 ÷ 4.5 = 3

•   3.2 + 3.2 + 3.2

•   1 : 3

OR

Shows the digits 96

OR

Shows or implies a complete correct method, eg:

•   13.5 ÷ 4.5 × 3.2

•   2.10 (*error*)

   4.5 | 13.5

      3.2 × 2.10 = 6.4 *(error)*

1

[2]

Q14.

$\dfrac{1}{2}$ or equivalent

> *! Algebra*
> *Accept equivalent fractions or decimals*

2

or

Shows or implies a correct first step of algebraic manipulation that either reduces the number of terms **or** collects variables on one side of the equation and numbers on the other **or** correctly removes the brackets, eg:

* $8y + 96 = 100$

* $y + 12 = 100 \div 8$

* $8y = 4$

OR

Shows or implies a complete correct method, eg:

* $100 \div 8 = 12$ *(error)*
    $12 - 12 = 0$

* $25 \times 4 = 100$
    $12.5 \times 8 = 100$
    $12.5 - 12$

1

> ***Do not accept*** *a first step of algebraic manipulation which has a conceptual error, eg:*
>
> * $y + 12 = 100$
> * $y + 96 = 100$
> * $8y + 12 = 100$
>
> *! Correct embedded solutions*
>
> *Award 1m for a response which shows* $\frac{1}{2}$ *, or equivalent, as the embedded solution to their working*

[2]

Q15.

Gives only the three correct prime numbers in any order, ie:

*   37, 41, 43

2

or

Gives at least two correct prime numbers **and** not more than one incorrect number, eg:

*   37, 39, 41, 43

*   39, 41, 43

*   41, 43

1

[2]

Q16.

(a) Gives an answer in the range 25 to 29 inclusive

1

(b) Gives an answer in the range 44 to 52 inclusive

1

[2]

Q17.

(a) Gives a correct explanation, eg:

- Her average is 15.75

- 14 + 23 + 13 + 13 = 63
  63 ÷ 4 is more than 15

- If the average is 15, Monday Wednesday and
  Thursday total 5 below and Tuesday is 8 above
  so the average must be > 15

- To walk an average of 15 km a day you need to
  have walked 60 km. Megan has walked 63 km
  so she is over the average of 15 km

  Accept minimally acceptable explanation, eg:
  - *63 ÷ 4*
  - *63 ÷ 4 =16*
  - *63 ÷ 4 = 15 r 3*

  Do not accept *incomplete or incorrect explanation, eg:*
  - *If you add up how far she walked in four
    days and divide by 4, it's more than 15*
  - *14 + 23 + 13 + 13 = 63*
  - *63 ÷ 4 = 15*

1

(b) 22

! Follow-through of incorrect total or average
*For 2m or 1m, accept follow-through from incorrect
value for the average **or** the total calculated for part (a)
used correctly in part (b), eg:*
- *for 16 as answer in part (a), award 2 marks for 85 − 4 ×
  16 = 21*

2

or

85 seen (*the total for 5 days*)

! Correct embedded solutions
*Award 1m, for a response which shows 22
as the embedded solution to their working*

OR

Shows or implies a complete correct method, eg:

- $(17 \times 5) - 14 - 23 - 13 - 13$

- 17 × 5 = 80 (*error*)
  80 − 63

1

[3]

Q18.

80

! Measures

2

or

Shows or implies a complete correct method, eg:

- $(10 \times 10.5) - (\frac{1}{2} \times 10 \times 5)$

- $\frac{1}{2}(5.5 + 10.5) \times 10$

- $(10 \times 5.5) + (\frac{1}{2} \times 10 \times 5) = 55 + 22.5$ (*error*)

1

[2]

Q19.

Gives a correct explanation with a number x such that $50 \le x < 55$, or $-5 < x < 5$, as an example, eg:

- 53 to the nearest hundred is 100, and to the nearest ten is 50 and 2 × 50 = 100

- If it's 50 or more but less than 55 it will round to 100 (nearest hundred) and 50 (nearest ten) and 100 is double 50

- 0 is 0 to the nearest 100 and 0 to the nearest 10 and twice 0 is 0
  Accept minimally acceptable explanation, eg:
  - *51 rounds to 50 and 100*
  - *54 ➜ 50 and 54 ➜ 100*
  - *50 rounds to 100*
  - *0 rounds to 0*
  Do not accept *incomplete or incorrect explanation, eg:*
  - *They used 51*
  - *50 × 2 = 100*
  - *They could use between 50 and 55, which round to 100*

U1

[1]

Q20.

(a) Gives a value for y such that $10y + 2$ is a prime number, eg:

- 0

- $\dfrac{1}{2}$

- 1.7

1

(b)　Gives a value for y such that $10y + 2$ is a square number, eg:

- −0.1

- 0.2

- 0.7

- 1.4

1

[2]

Q21.

(a)　5 : 1

> ***Do not accept*** *ratio not simplified, eg*
> - *15 : 3*

1

(b)　2006

2
U1

or

Identifies that Tom will be 18 and Ben will be 6, eg:

- 3 : 1 = 18 : 6

- 13 : 1
  14 : 2 = 7 : 1
  15 : 3 = 5 : 1
  16 : 4 = 4 : 1
  17 : 5
  18 : 6

1

[3]

Q22.

6

U1

[1]

Q23.

Gives all three possible values for k, in any order, eg 15, 16, 17

1

Gives both possible values for w, in either order, eg 6, 7

1

As evidence of a correct method:

Gives a completely correct response to at least one question part

OR

Makes not more than three errors or omissions throughout the question, eg:

- For the 1st part: 15, 16, 17, 18 [one error]
  For the 2nd part: 7 [one omission]

- For the 1st part: 14, 15, 16 [one error, one omission]
  For the 2nd part: 6, 7, 8 [one error]

- For the 1st part: 15 [two omissions]
  For the 2nd part: 7 [one omission]

OR

Includes non-integers within an otherwise correct response for at least one question part, eg:

- For the 1st part: 15, 15.5, 16, 16.5, 17

- For the 1st part: 14.5