

## Year 6 Maths Reasoning Questions

Dear Year 6,

Here are 25 reasoning questions from past SATs papers. You should aim to answer 5 questions per day; they do not have to be answered in the correct order. The questions this week mainly focus on factors, multiples, prime and square numbers. If you can't remember what these are, please use your Maths CGP Study Guide to remind you!

The answers are included at the end of the document. Once you have finished your maths, you can mark your own work, or ask an adult to do it for you. If you make any mistakes, try and discover where you went wrong.

Mrs Stevens & Mrs Dines

**Q1.**

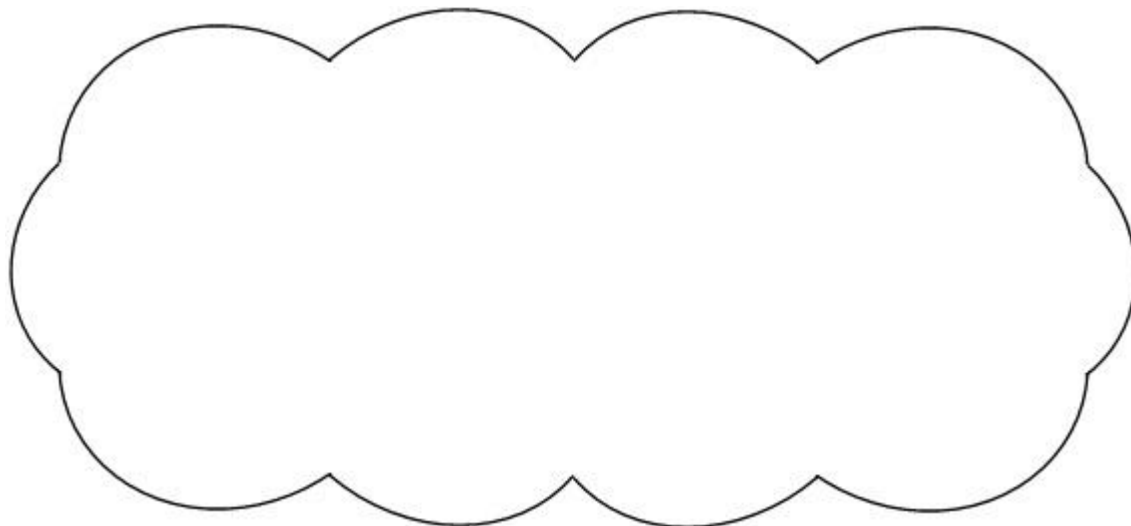
Circle the **prime** number.

95

89

87

Explain how you know the other numbers are **not** prime.



1 mark

**Q2.**

Here are five numbers.

~~2~~    3    4    5    6

Write each number on the correct cards.

The number 2 has been written on the correct cards for you.

**Prime  
numbers**

2

**Factors of  
12**

2

**Factors of  
15**

2 marks

**Q3.**

In the circles, write a multiple that belongs to each set.

One has been done for you.

|                         |                |    |
|-------------------------|----------------|----|
| numbers from 1 to 99    | multiple of 10 | 50 |
| numbers from 101 to 199 | multiple of 20 |    |
| numbers from 201 to 299 | multiple of 30 |    |
| numbers from 301 to 399 | multiple of 40 |    |

2 marks

**Q4.**

Here is part of a number sequence.

The numbers in the sequence increase by 25 each time.

50                  75                  100                  125                  ...

Circle **all** of the numbers below that will appear in the sequence.

255                  650                  735                  900                  995

1 mark

**Q5.**

36 and 64 are both square numbers

They have a sum of 100

Find two **square** numbers that have a sum of **130**

and

1 mark

**Q6.**

Emma thinks of two **prime** numbers.

She adds the two numbers together.

Her answer is 36

Write **all** the possible pairs of prime numbers Emma could be thinking of.

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2 marks

**Q7.**

Fill in the three missing whole numbers in this calculation.

Each number is less than 10

$$\square \times \square \times \square = 105$$

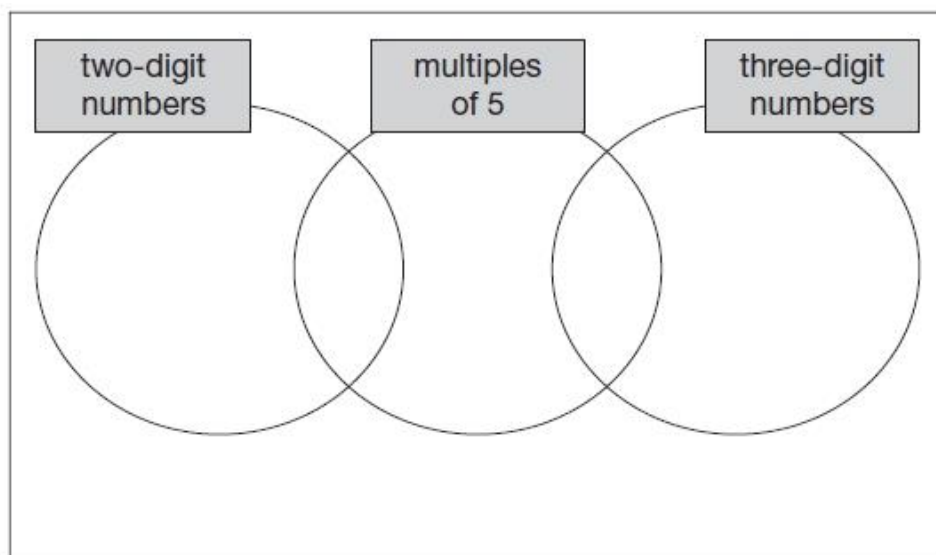
1 mark

**Q8.**

Here is a diagram for sorting numbers.

Write **each** number in its correct place on the diagram.

2            20            201            2000



2 marks

**Q9.**

Here is a sorting diagram for numbers.

Write a number **less than 100** in each space.

|                     | even | not even |
|---------------------|------|----------|
| a square number     |      |          |
| not a square number |      |          |

2 marks

**Q10.**

Use **each** number card **once** to make the answer to each calculation an **even** number.

3

4

5

$$5 \times \boxed{\phantom{00}}$$

$$12 \div \boxed{\phantom{00}}$$

$$9 + \boxed{\phantom{00}}$$

2 marks

**Q11.**

Here is a number sentence.

$$\boxed{?} + 27 > 85$$

Circle **all** the numbers below that make the number sentence correct.

30

40

50

60

70

1 mark

**Q12.**

Here is a sorting diagram with four sections, **A**, **B**, **C** and **D**.

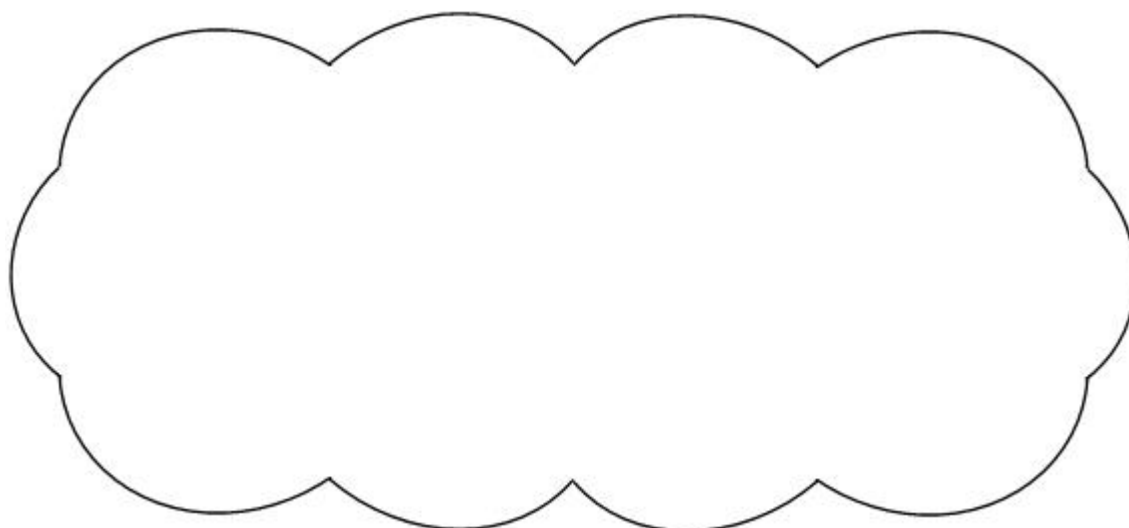
|                      | multiple of 10 | not a multiple of 10 |
|----------------------|----------------|----------------------|
| multiple of 20       | <b>A</b>       | <b>B</b>             |
| not a multiple of 20 | <b>C</b>       | <b>D</b>             |

Write a number that could go in section **C**.

1 mark

Section **B** can never have any numbers in it.

Explain why.



1 mark

### Q13.

Here are four labels.

|      |                |          |                       |
|------|----------------|----------|-----------------------|
| even | multiples of 9 | not even | not<br>multiples of 9 |
|------|----------------|----------|-----------------------|

Write each label in the correct position on the sorting diagram below.

|  |    |    |
|--|----|----|
|  |    |    |
|  | 72 | 56 |
|  | 54 | 84 |
|  | 63 | 49 |
|  | 45 | 75 |

1 mark

### Q14.

Here are six digit cards.

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|

Use **all six** digit cards to make three multiples of 3

|                         |                         |                         |
|-------------------------|-------------------------|-------------------------|
| <div></div> <div></div> | <div></div> <div></div> | <div></div> <div></div> |
|-------------------------|-------------------------|-------------------------|

1 mark



**Q15.**

The numbers in this sequence increase by 3 each time.

3            6            9            12    ...

The numbers in this sequence increase by 5 each time.

5      10      15      20      ...

Both sequences continue.

Write a number **greater than 100** which will be in **both** sequences.

Show  
your  
method

2 marks

**Q16.**

Here are five number cards.

|    |    |    |    |    |
|----|----|----|----|----|
| 48 | 49 | 50 | 51 | 52 |
|----|----|----|----|----|

Use each card **once** to make every statement below correct.

is a multiple of 3

is a multiple of 4

is a multiple of 5

is a multiple of 6

is a multiple of 7

2 marks

**Q17.**

Complete this sentence.

Every number with a factor of **10** must also have factors of

and  and

1 mark

**Q18.**

Here is a diagram for sorting numbers.

Write **one number** in each box.

One is done for you.

|                     | multiple of 5 | not a multiple of 5 |
|---------------------|---------------|---------------------|
| multiple of 3       | 30            |                     |
| not a multiple of 3 |               |                     |

2 marks

**Q19.**

A **square** number and a **prime** number have a total of 22

What are the two numbers?

|               |   |              |      |
|---------------|---|--------------|------|
| <div></div>   | + | <div></div>  | = 22 |
| square number |   | prime number |      |

1 mark

**Q20.**

Write **all** the common multiples of 3 and 8 that are **less than 50**

\_\_\_\_\_ 1 mark

**Q21.**

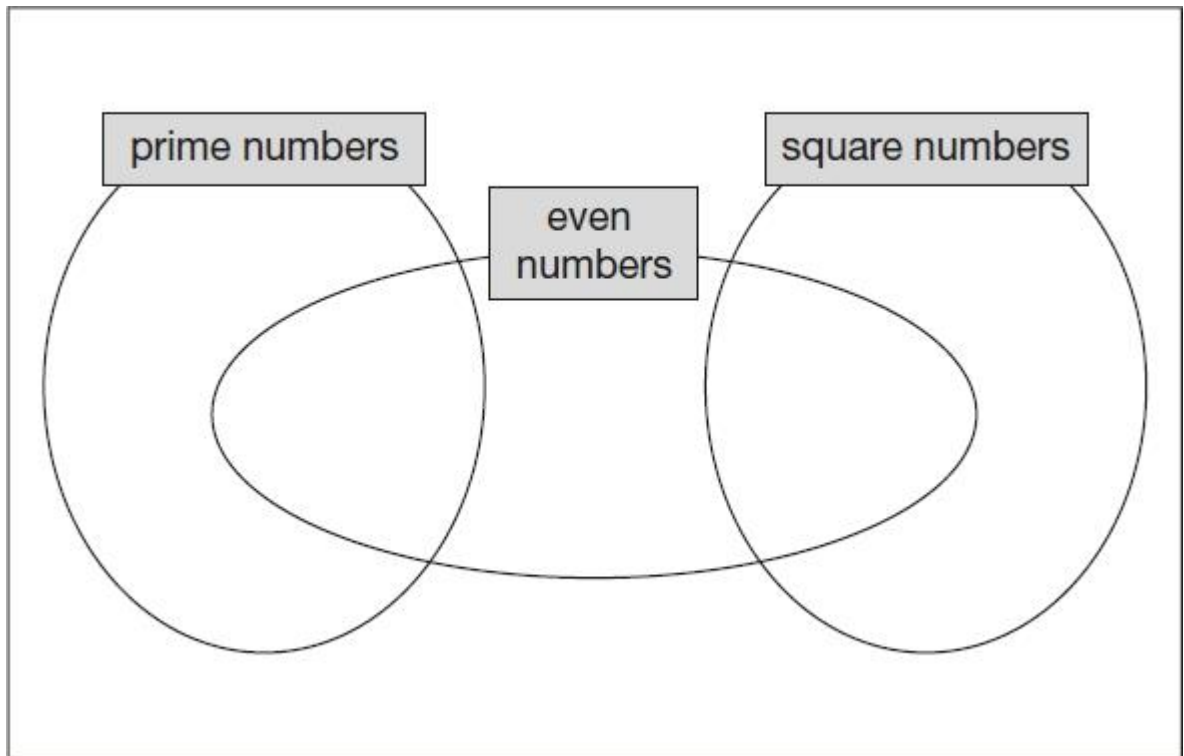
Write each number in its correct place on the diagram.

16

17

18

19



2 marks

**Q22.**

Write three factors of 30 that are **not** factors of 15

2 marks

**Q23.**

Tick the numbers that are common factors of both **12 and 18**

2 ☐

3 ☐

6 ☐

9 ☐

12 ☐

2 marks

**Q24.**

Chen uses these digit cards.

5

6

9

She makes a 2-digit number and a 1-digit number.

She multiplies them together.

Her answer is a **multiple of 10**

What could Chen's multiplication be?

×

1 mark

**Q25.**

The numbers in this sequence increase by the same amount each time.

Write the missing numbers.

|                      |    |    |                      |    |                      |
|----------------------|----|----|----------------------|----|----------------------|
| <input type="text"/> | 42 | 49 | <input type="text"/> | 63 | <input type="text"/> |
|----------------------|----|----|----------------------|----|----------------------|

2 marks

## Mark schemes

### Q1.

Award **ONE** mark for a correct explanation of why the 95 **AND** 87 are **NOT** prime, e.g.

- 87 is divisible by 3 and/or 29 **AND** 95 is divisible by 5 and/or 19
- 87 is in the 3 times table **AND** 95 is in the 5 times table
- 95 is divisible by five because every number in the five times table ends in five or zero. 87 is divisible by three because 9 is in the three times table so is ninety. Ninety minus three is 87
- $8 + 7 = 15$  and 15 is divisible by 3 **AND** 95 is divisible by 5

*No mark is awarded for circling '89' alone.*

*Both non-primes must be explained correctly for the award of the mark.*

**Do not** accept vague or incomplete explanations, e.g.

- *The other 2 numbers have more than 2 factors (vague)*
- *87 is divisible by 3 (incomplete).*

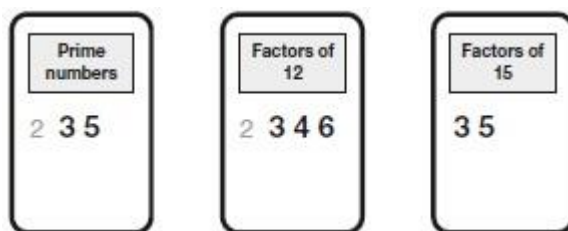
**Do not** accept explanations which include incorrect mathematics or incorrect information that is relevant to the explanation, e.g.

- $3 \times 27 = 87$
- *89 has three factors*
- *no numbers go into 89*

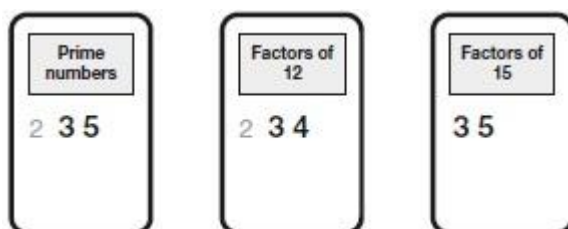
[1]

### Q2.

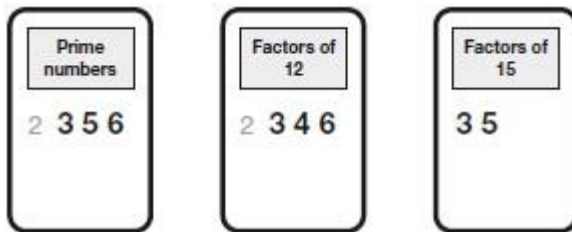
Award **TWO** marks for all four given numbers placed completely correctly 7 times, as shown:



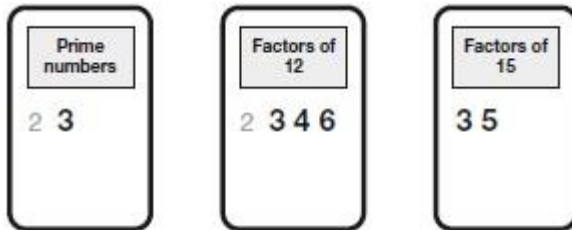
If the answer is incorrect, award **ONE** mark for three of the given numbers all placed completely correctly, e.g.



OR



OR



*Accept the numbers in any order.*

*Ignore any additional numbers not given in the question.*

Up to 2m

[2]

**Q3.**

Award **TWO** marks for three rows completed correctly as shown:

50

(120) OR 140 OR 160 OR 180

(210) OR 240 OR 270

(320) OR 360

If the answer is incorrect, award **ONE** mark for two rows correct.

Up to 2

[2]

**Q4.**

Two numbers circled as shown:

255 (650) 735 (900) 995

*Accept alternative unambiguous indications, eg numbers ticked, crossed or underlined.*

[1]

**Q5.**

49 AND 81

OR



121 **AND** 9

*Numbers may be given in either order.*

U1

[1]

**Q6.**

All four pairs of prime numbers listed, ie:

- 5 and 31
- 7 and 29
- 13 and 23
- 17 and 19

*For 2m, accept all prime numbers listed in pair order, ie:*

- 5, 31, 7, 29, 13, 23, 17, 19

2

**or**

Three or four correct pairs of prime numbers listed and not more than one incorrect pair of numbers

*For 1m, accept all eight prime numbers listed, and no other numbers, without any indication of how the numbers are paired, eg:*

- 5, 7, 13, 17, 19, 23, 29, 31

1

[2]

**Q7.**

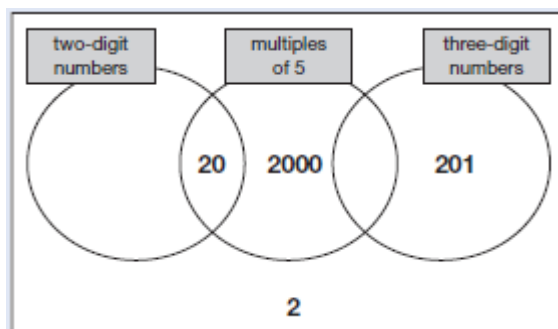
3 **AND** 5 **AND** 7

*Numbers may be given in any order.*

[1]

**Q8.**

Award **TWO** marks for all four numbers correctly placed as shown:



If the answer is incorrect, award **ONE** mark for three numbers correctly placed.

**Do not** accept numbers written in more than one region.

Accept alternative unambiguous indications, eg lines drawn from the numbers to the appropriate regions of the diagram.

Up to 2m

[2]

**Q9.**

Award **TWO** marks for a correct number written in each of the four boxes.

|                     | even                                                        | not even                                                 |
|---------------------|-------------------------------------------------------------|----------------------------------------------------------|
| a square number     | 0 <b>OR</b> 4 <b>OR</b> 16<br><b>OR</b> 36 <b>OR</b> 64     | 1 <b>OR</b> 9 <b>OR</b> 25<br><b>OR</b> 49 <b>OR</b> 81  |
| not a square number | even <b>AND</b><br>not a square <b>AND</b><br>less than 100 | odd <b>AND</b><br>not square <b>AND</b><br>less than 100 |

If the answer is incorrect, award **ONE** mark for three boxes completed correctly.

Accept more than one number in each box, provided all are correct.

Up to 2

[2]

**Q10.**

Award **TWO** marks for all three calculations completed correctly as shown:

$$5 \times \boxed{4}$$

$$12 \div \boxed{3}$$

$$9 + \boxed{5}$$

Answers to the calculations are not required for the award of the mark.

If the answer is incorrect, award **ONE** mark for two calculations completed correctly, eg

$$5 \times \boxed{4}$$

$$12 \div \boxed{5}$$

$$9 + \boxed{3}$$

Accept for **ONE** mark

4, 3, (\*) **OR**

4, (\*), 5 **OR**  
 4, (\*), 3 **OR**  
 (\*), 3, 5  
 where (\*) is any number or blank.

Up to 2

[2]

### Q11.

Numbers circled as shown:

30 40 50 (60) (70)

*Accept alternative unambiguous indications,  
 eg numbers ticked, crossed or underlined.*

[1]

### Q12.

Any odd numbered multiple of 10, ie 10 **OR** 30 **OR** 50 **OR** 70 **OR** 90 **OR**  
 any number ending with any of the pairs of digits above.

1

An explanation which recognises that all multiples of 20 are also multiples of 10, eg:

- 'Because all the numbers in the 20 times table are also in the 10 times table'
- 'Because all multiples of 20 are multiples of 10'
- 'Because 20 is in the 10 times table'
- 'All multiples of 20 go in box A because 10 goes into them'
- '20 is a multiple of both 20 and 10, and so is 40, 60, etc'
- 'Because if it's not a multiple of 10, it can't be a multiple of 20'
- 'Because if it is a multiple of 20, it has to be a multiple of 10'
- 'Because 10 is a factor of 20'.

**Do not** accept vague or arbitrary explanations, eg:

- 'Because 40 is a multiple of 10'
- 'Because they would be in box A instead'
- 'Because all the multiples of 10 are multiples of 20'
- 'Because 10 is a multiple of 20'.

1

[2]

### Q13.

Diagram completed as shown:

|          | multiples of 9 | not multiples of 9 |
|----------|----------------|--------------------|
| even     | 72<br>54       | 56<br>84           |
| not even | 63<br>45       | 49<br>75           |

Accept recognisable misspellings.

Accept 'odd' for 'not even'.

Accept alternative unambiguous indications, eg lines drawn from the labels to the appropriate parts of the diagram.

[1]

#### Q14.

Three multiples of 3, eg:

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 3 | 6 | 2 | 4 | 5 | 7 |
|---|---|---|---|---|---|

OR

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 6 | 3 | 7 | 2 | 5 | 4 |
|---|---|---|---|---|---|

Multiples may be given in any order.

Digits may be in either order, eg 24 **OR** 42

**Do not** accept digits used more than once.

**Do not** accept digits other than those shown.

U1

[1]

#### Q15.

Award **TWO** marks for a multiple of 15 which is greater than 100, eg

105 **OR** 120 **OR** 135 **OR** 150 **OR** 300

Accept more than one answer if all are correct.

If the answer is incorrect, award **ONE** mark for evidence of appropriate method, eg:

Accept for **ONE** mark 30, 45, 60, 75 **OR** 90

• 90 93 96 99 102 105 108 ...  
90 95 100 105 110 115 ...

← Not spotting matching number (105)

• 90 93 96 98 101 104 107 (110) ...  
90 95 100 105 (110) 115 ...

← One step size incorrect (96 to 98)

• 15 30 45 60 75 80 95 110 (125)

← One step size incorrect (75 to 80)

•  $3 \times 5 \times 20$   
OR  
 $15 \times 10$

← Multiple greater than 100 but not calculated

Answer need not be obtained for the award of **ONE** mark.

Up to 2

[2]

#### Q16.

Award **TWO** marks for the correct answer as shown:

51

52

50

48

49

If the answer is incorrect, award **ONE** mark for 4 true statements with no number repeated (within those 4), eg:

48

OR

(blank)

52

52

50

50

51

48

49

49

***Do not** accept numbers other than those given.  
 (Multiple of 3 can be 48 **OR** 51)  
 (Multiple of 4 can be 48 **OR** 52)*

Up to 2  
U1

[2]

**Q17.**  
 1, 2 and 5

*Numbers may be given in any order.*

[1]

**Q18.**  
 Award **TWO** marks for three boxes completed correctly, e.g:

|               |               |                            |
|---------------|---------------|----------------------------|
|               | multiple of 5 | <b>not</b> a multiple of 5 |
| multiple of 3 | 30            | <b>3, 6, 9 etc</b>         |

|                           |               |                |
|---------------------------|---------------|----------------|
| not a<br>multiple<br>of 3 | 5, 10, 20 etc | 1, 2, 4, 7 etc |
|---------------------------|---------------|----------------|

If the answer is incorrect, award **ONE** mark for at least two boxes completed correctly.

*Accept more than one correct multiple in any box.*

**Do not** accept any box containing a correct multiple and an incorrect number.

Up to 2

[2]

### Q19.

Both numbers correct as shown:

$$\boxed{9} + \boxed{13} = 22$$

square number      prime number

*Numbers must be in the correct order.*

**Do not** accept:

$$\boxed{3^2} + \boxed{13} = 22$$

square number      prime number

[1]

### Q20.

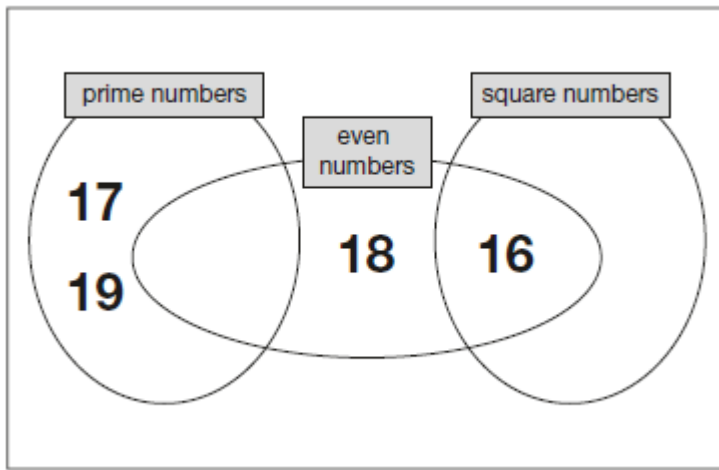
24 **AND** 48 only

*Numbers may be given in either order.*

[1]

### Q21.

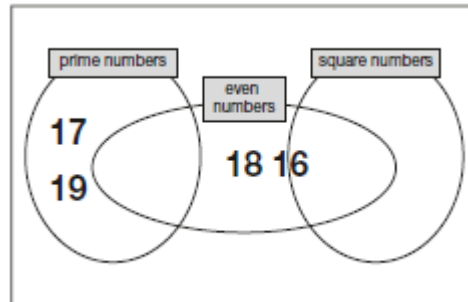
Award **TWO** marks for all four numbers placed correctly as shown:



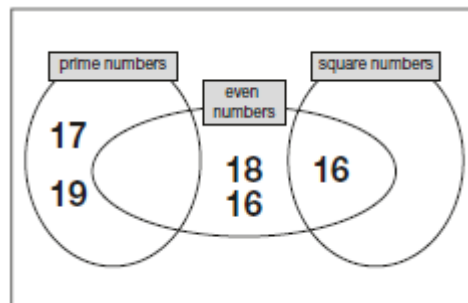
If the answer is incorrect, award **ONE** mark for three numbers placed correctly.

*Accept alternative unambiguous indications, e.g. lines drawn from the numbers to the appropriate regions of the diagram.*

**Do not** accept numbers written in more than one region, e.g.



**OR**



Up to 2m

[2]

## Q22.

Award **TWO** marks for any three of the following numbers written in any order:

- 2
- 6
- 10
- 30

If the answer is incorrect, award **ONE** mark for two numbers correct.

**Q23.**

Award **TWO** marks for only three correct boxes ticked, as shown:

|    |                                     |
|----|-------------------------------------|
| 2  | <input checked="" type="checkbox"/> |
| 3  | <input checked="" type="checkbox"/> |
| 6  | <input checked="" type="checkbox"/> |
| 9  | <input type="checkbox"/>            |
| 12 | <input type="checkbox"/>            |

Award **ONE** mark for:

- only two correct boxes ticked and no incorrect boxes ticked

**OR**

- three correct boxes ticked and one incorrect box ticked.

*Accept alternative unambiguous positive indications, e.g. Y.*

Up to 2 marks

**Q24.**

$95 \times 6$  **OR**  $96 \times 5$

**Q25.**

Award **TWO** marks for three correct numbers, as shown:

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 35 | 42 | 49 | 56 | 63 | 70 |
|----|----|----|----|----|----|

Award **ONE** mark for two numbers correctly placed.

Up to 2m