**Q1.**

$j$ and $k$ stand for two numbers.

Double $j$ equals half of $k$.

Write numbers to complete the sentence below.

When $j$ is ⬚ then $k$ is ⬚

1 mark

**Q2.**

◻ and ◯ each stand for a different number.

◻ = 34

◻ + ◻ = ◯ + ◯ + ◻

What is the value of ◯ ?

1 mark

**Q3.**

The rule for this sequence of numbers is **'add 3 each time'**.

**1    4    7    10    13    16    ...**

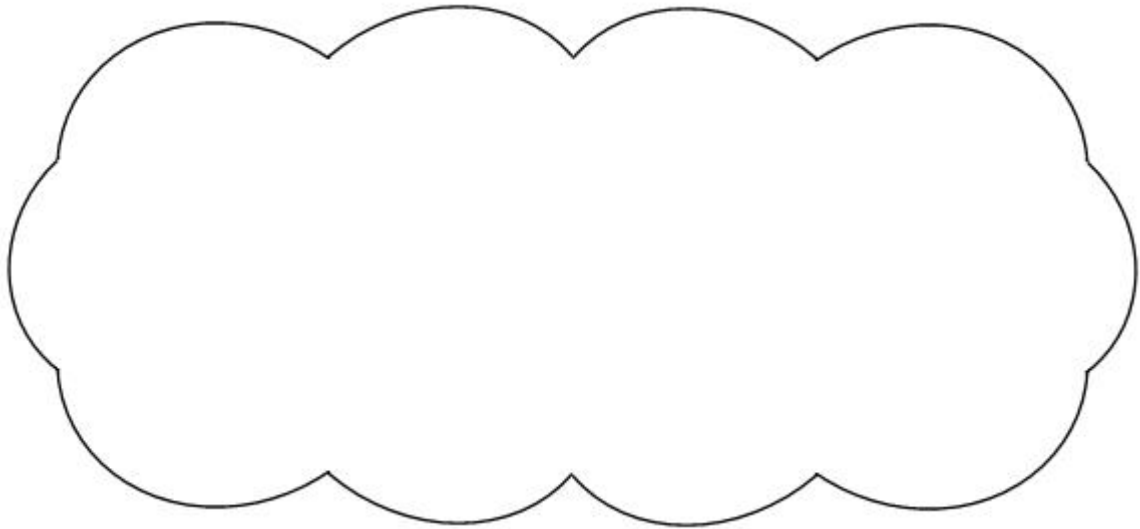The sequence continues in the same way.

Mary says,

   *'No matter how far you go there will never be a multiple of 3 in the sequence'.*

Is she correct?
Circle Yes or No.                **Yes  /  No**

Explain how you know.

**Q4.**

Here is a pattern of number pairs.

| $a$ | $b$ |
|---|---|
| 1 | 9 |
| 2 | 19 |
| 3 | 29 |
| 4 | 39 |

Complete the **rule** for the number pattern.

$$b = \boxed{\phantom{00}} \times a - \boxed{\phantom{00}}$$

**Q5.**

Look at these equations.

$$a = 2b$$

$$b = 3c$$

Which equation below is also true?

Put a ring round the correct one.
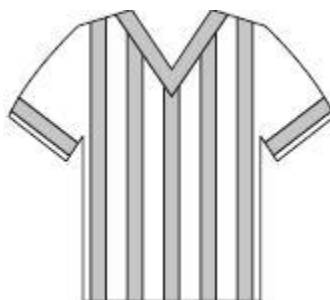
$$b = 2a \qquad a = 2b + 3c \qquad a = 5c$$

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

**Q6.**

Adam chooses the colours for a new team shirt.

The shirt has **two** colours.



There are four colours to choose from: **yellow**, **blue**, **white** and **red**.

Write the **two** missing combinations.

The shirt could be:

- yellow and blue

- yellow and white

- yellow and red

- blue and white.

_____ and _____

_____ and _____

**Q7.**

$$x + 2y = 20$$

$x$ and $y$ are whole numbers **less than 10**

What could $x$ and $y$ be?

$$x = \boxed{\phantom{xxxxxx}}$$

$$y = \boxed{\phantom{xxxxxx}}$$

**Q8.**

Here is an equation.

$m - 2n = 10$

When $n = 20$ what is the value of $m$?

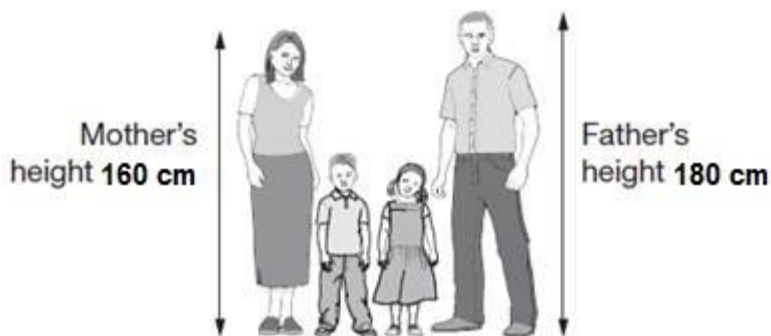$m = $ _____

When $m = 20$ what is the value of $n$?

$n = $ _____

**Q9.**

Here are Alfie and Emma with their parents.

Mother's height **160 cm**     Father's height **180 cm**

You can use the table below to predict how tall children will be when they are adults.

There is one formula for boys and a different one for girls:

| Boy's predicted height | Girl's predicted height |
| --- | --- |

| 0.4(x + y) + 42 | 0.4(x + y) + 29 |
|---|---|

x is the father's height in cm. y is the mother's height in cm.

(a) Calculate the predicted height of Alfie when he is an adult.

cm

1 mark

(b) When Emma is an adult, she is predicted to be taller than her mother.

How much taller?

cm

1 mark
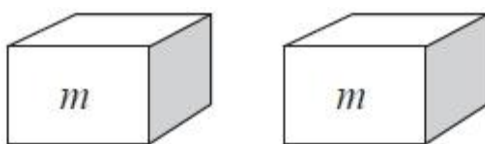
## Q10.

(a) There are $n$ counters in Alfie's bag.



Alfie puts **3** more counters in the bag.

Write an expression for the number of counters that are in the bag now.

1 mark

(b) Megan has two boxes.

There are $m$ counters in each box.



She puts all her counters together in a pile, then removes **5** of them.

Write an expression for the number of counters that are in the pile now.

## Q11.

*x* stands for an **odd** number.

*y* stands for an **even** number.

Look at the expressions below.

For each expression, tick to show if it is odd or even.

The first one is done for you.

|  | odd | even |
|---|---|---|
| $x + y$ | ✓ |  |
| $x + 2y$ |  |  |
| $2(x + y)$ |  |  |
| $xy$ |  |  |
| $x^2 + y$ |  |  |

## Q12.

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.

$y =$

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

$y =$

## Q13.

In this sequence, the rule to get the next number is

**Multiply by 2, and then add 3**

Write the missing numbers.

| | 25 | 53 | |
|---|---|---|---|

## Q14.

Dev says,

I had £10

I gave some money away.

Which expression shows how much money Dev has left?

*a* is the amount of money, in pounds, that Dev gave away.

Tick **one**.

10 + *a* ☐

10 ÷ *a* ☐

*a* – 10 ☐

$10 - a$ ☐

$a \times 10$ ☐

## Mark schemes

### Q1.

Two numbers where the value of $k$ is four times the value of $j$, eg

When $j$ is  **5**   When $k$ is  **20**

**OR**

When $j$ is  **11**   When $k$ is  **44**

[1]

### Q2.

17

**U1**

[1]

### Q3.

Explanation which recognises that
each number is one more than a multiple of 3, eg

- 'It starts at 1 and keeps adding 3 so it misses all the multiples of 3',

- 'Multiples of 3 are all 1 less than the numbers'.

> *No mark is awarded for circling 'Yes' alone.*
> ***Do not*** *accept vague or arbitrary explanations such as*
> - *'They're too big';*
> - *'It doesn't go far enough';*
> - *'It is adding 3 all the time'.*
> *If 'No' is circled but a correct unambiguous explanation is given then award the mark.*

[1]

### Q4.

Both numbers correct as shown:

$b = $  **10**  $\times a - $  **1**

[1]

### Q5.

Equation circled as shown:

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

$\boxed{a = 6c}$

$a + b = 5$

*Accept unambiguous indication*

[1]

## Q6.

Two combinations, as shown:

blue and red **OR** red and blue

**AND**

white and red **OR** red and white.

[1]

## Q7.

Award **ONE** mark for any pair of whole numbers less than 10 that satisfy the equation, i.e.

$x = 8$ **AND** $y = 6$

**OR**

$x = 6$ **AND** $y = 7$

**OR**

$x = 4$ **AND** $y = 8$

**OR**

$x = 2$ **AND** $y = 9$

[1]

## Q8.

(a)    50

1

(b)    5

1

[2]

## Q9.

(a)    178

1

(b)    5

1

[2]

## Q10.

    (a)    $n + 3$ **or** $3 + n$

> *!    Algebra*
>
> *!    Alternative letter used, eg, for part (a), accept* m *used instead of* n*, if the expression is otherwise correct:*
>
> - *m + 3*

                **1**

    (b)    $2m - 5$

> *!    Condone unsimplified or unconventional algebra, eg, for part (b):*
>
> - *m + m − 5*
> - *m2 − 5*

                **1**

                **[2]**

## Q11.

Makes all four correct decisions, ie:

-     odd    even



> *Accept unambiguous indications, eg:*
>
> - *'y' or 'x' for ticked in each row*

                **2**

***or***

Makes three correct decisions

                **1**

                **[2]**

## Q12.

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

- 0

- $\frac{1}{2}$

- 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]**

## Q13.
(a) 11 written in the first box, as shown:

| 11 | 25 | 53 | |
|----|----|----|----|

1

(b) 109 written in the last box, as shown:

| | 25 | 53 | 109 |
|----|----|----|----|

1

**[2]**

## Q14.
Award **ONE** mark for the correct box ticked, as shown:

Tick **one.**

| | |
|----|----|
| 10 + $a$ | |
| 10 ÷ $a$ | |
| $a$ − 10 | |
| 10 − $a$ | ✓ |
| $a$ × 10 | |

*Accept alternative unambiguous positive indication of the correct answer, e.g. Y.*

**[1]**