

## Predictions

### Instructions

- Work alone
- Follow the questions carefully. Read all instructions, including how to score marks.
- All solutions are to be written on this paper.

- 1** Complete the table of values for the rule  $y = 2x$  below. (You will notice that two of the answers with the method for the working out have already been completed and recorded.) Write the answers neatly on the table below.

$$y = 2x$$

|     |   |   |   |   |   |
|-----|---|---|---|---|---|
| $x$ | 0 | 1 | 2 | 3 | 4 |
| $y$ | 0 | 2 |   |   |   |

|                              |                              |
|------------------------------|------------------------------|
| <b>If <math>x = 0</math></b> | <b>If <math>x = 1</math></b> |
| $y = 2x$                     | $y = 2x$                     |
| $= 2 \times 0$               | $= 2 \times 1$               |
| $= 0$                        | $= 2$                        |

Score the maximum of **2 marks** if you complete the table with **no errors**. If you make one mistake, **1 mark** and more than one mistake, **0 marks**.

*While there are no marks for the working, it will help you to do the question and maximise your marks.*

- 2** Complete the table of values for the rule  $y = 2x + 3$  below. (You will notice that the answer with the working out has already been completed and recorded.) Write the answers neatly on the table below.

$$y = 2x + 3$$

|     |   |   |   |   |   |
|-----|---|---|---|---|---|
| $x$ | 0 | 1 | 2 | 3 | 4 |
| $y$ | 3 |   |   |   |   |

|                              |                              |
|------------------------------|------------------------------|
| <b>If <math>x = 0</math></b> | <b>If <math>x = 1</math></b> |
| $y = 2x + 3$                 | $y = 2x + 3$                 |
| $= 2 \times 0 + 3$           | $= 2 \times 1 + 3$           |
| $= 3$                        | $=$                          |

Score the maximum of **2 marks** if you complete the table with **no errors**. If you make one mistake, **1 mark** and more than one mistake, **0 marks**.

*While there are no marks for the working, it will help you to do the question and maximise your marks.*

- 3** Complete the table of values for the rule  $y = 2x + 4$  below. (You will notice that the answer with the working out has already been completed and recorded.) Write the answers neatly on the table below.

$$y = 2x + 4$$

|     |   |   |   |   |   |
|-----|---|---|---|---|---|
| $x$ | 0 | 1 | 2 | 3 | 4 |
| $y$ | 4 |   |   |   |   |

|                              |                              |
|------------------------------|------------------------------|
| <b>If <math>x = 0</math></b> | <b>If <math>x = 1</math></b> |
| $y = 2x + 4$                 | $y = 2x + 4$                 |
| $= 2 \times 0 + 4$           | $=$                          |
| $= 4$                        | $=$                          |

Score the maximum of **2 marks** if you complete the table with **no errors**. If you make one mistake, **1 mark** and more than one mistake, **0 marks**.

*While there are no marks for the working, it will help you to do the question and maximise your marks.*

4 Complete the calculations below the table of values for the rules given. **You are required to find the difference between each pair of y-values (answers).** (You will notice that some of the solutions with the working out have already been completed and recorded.) Write the answers neatly below the table.

**NOTE:** To get a difference you have to subtract the first number from the second number .

For each table, you will score the maximum of **2 marks** if you complete the table with no errors. If you make one mistake, **1 mark** and more than one mistake, **0 marks**.

*While there are no marks for the working, it will help you to do the question and maximise your marks.*

$$y = 2x + 1$$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 1 | 3 | 5 | 7 | 9 |

|                  |                |     |  |  |
|------------------|----------------|-----|--|--|
| $3 - 1$<br>$= 2$ | $5 - 3$<br>$=$ | $=$ |  |  |
|------------------|----------------|-----|--|--|

$$y = 2x \text{ (Use your answers from question on the previous page 1)}$$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 0 | 2 |   |   |   |

|                  |  |  |  |  |
|------------------|--|--|--|--|
| $2 - 0$<br>$= 2$ |  |  |  |  |
|------------------|--|--|--|--|

$$y = 2x + 3 \text{ (Use your answers from question 2 on the previous page)}$$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 3 |   |   |   |   |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|--|--|--|--|--|--|

$$y = 2x + 4 \text{ (Use your answers from question 3 on the previous page)}$$

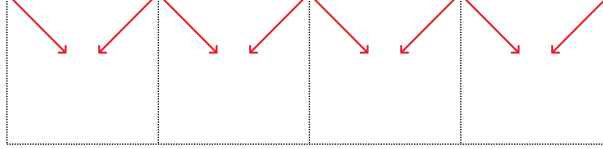
|   |   |   |   |   |   |
|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 4 |   |   |   |   |

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|--|--|--|--|--|--|

5 Complete the calculations below the table of values for the rules given. **You are required to find the difference between each pair of y-values (answers).** (You will notice that some of the solutions with the working out have already been completed and recorded.) Write the answers neatly below the table.

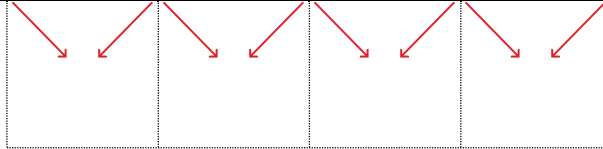
$$y = 3x$$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 0 |   |   |   |   |



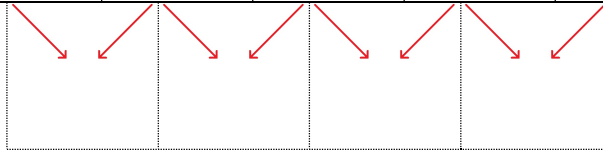
$$y = 3x + 4$$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 4 |   |   |   |   |



$$y = 3x + 7$$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 |
| y | 7 |   |   |   |   |



For each table, you will score the maximum of **2 marks** if you complete the table with **no errors**. If you make one mistake, **1 mark** and more than one mistake, **0 marks**.

*While there are no marks for the working, it will help you to do the question and maximise your marks.*

6 Record your observations by completing the following questions.

What do you notice about the solutions for the differences?

Why do you think this happens?

You will score the maximum of **2 marks** if you recognise and explain the pattern for how much each y-value changes and which number each pattern starts with. You will score **1 mark** if you recognise and explain the pattern for how much each y-value changes or which number each pattern starts with. Incorrect or no answer scores **0 marks**.

*These answers should be written as full sentences using appropriate mathematical terms.*

7 A linear number pattern can be calculated using a formula written in the form  $y = mx + b$ .  
 e.g.

$$y = 2x + 1$$

$$y = 2x - 5$$

$$y = 2x \text{ (the value of } b \text{ is } 0)$$

$$y = 3x + 1$$

$$y = 3x + 3$$

$$y = 3x - 2$$

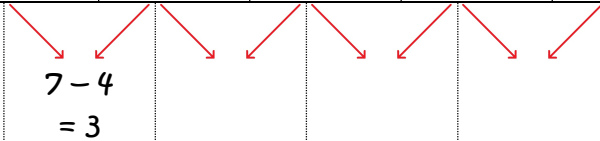
If you know the pattern, you can work out the value of 'm' and 'b' and write the rule.

'm' is the difference between each term

'b' is the y value when  $x = 0$

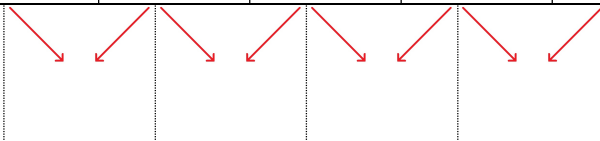
Find the rules for each of the table of values below. **You are required to find the value of 'm' and 'b' and write the rule by substituting into  $y = mx + b$ .** (You will notice that some of the working out has already been completed to help you get started.) Write the answers neatly below the table.

|   |   |   |    |    |    |
|---|---|---|----|----|----|
| x | 0 | 1 | 2  | 3  | 4  |
| y | 4 | 7 | 10 | 13 | 16 |



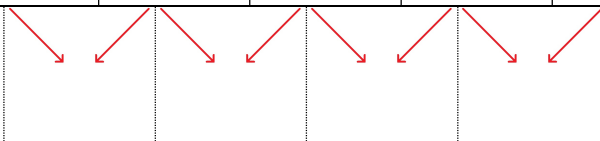
|     |              |
|-----|--------------|
| m = | $y = mx + b$ |
| b = | $y =$        |

|   |   |   |   |    |    |
|---|---|---|---|----|----|
| x | 0 | 1 | 2 | 3  | 4  |
| y | 4 | 6 | 8 | 10 | 12 |



|     |              |
|-----|--------------|
| m = | $y = mx + b$ |
| b = | $y =$        |

|   |   |   |   |    |    |
|---|---|---|---|----|----|
| x | 0 | 1 | 2 | 3  | 4  |
| y | 1 | 5 | 9 | 13 | 17 |



|     |              |
|-----|--------------|
| m = | $y = mx + b$ |
| b = | $y =$        |

For each table, you will score the maximum of **2 marks** if you complete the rule with no errors. If you make one mistake, **1 mark** and more than one mistake, **0 marks**.

*While there are no marks for the working, it will help you to do the question and maximise your marks.*

**8 BONUS QUESTION 1**

Find the rules for each of the table of values below. **You are required to find the value of 'm' and 'b' and write the rule by substituting into  $y = mx + b$ .** (You will notice that some of the working out has already been completed to help you get started.) Write the answers neatly below the table.

|   |    |   |   |   |   |
|---|----|---|---|---|---|
| x | 0  | 1 | 2 | 3 | 4 |
| y | 10 | 8 | 6 | 4 | 2 |

$$\begin{aligned} 8 - 10 \\ = -2 \end{aligned}$$

|     |              |
|-----|--------------|
| m = | $y = mx + b$ |
| b = | $y =$        |

|   |    |    |   |   |   |
|---|----|----|---|---|---|
| x | 0  | 1  | 2 | 3 | 4 |
| y | -4 | -1 | 2 | 5 | 8 |

$$\begin{aligned} -1 - -4 \\ = 3 \end{aligned}$$

|     |              |
|-----|--------------|
| m = | $y = mx + b$ |
| b = | $y =$        |

For each table, you will score the maximum of **2 marks** if you complete the rule with no errors. If you make one mistake, **1 mark** and more than one mistake, **0 marks**.

*While there are no marks for the working, it will help you to do the question and maximise your marks.*

**9 BONUS QUESTION 2**

Is it possible to find a linear rule for the table of values below? **You are required to try to find the value of 'm' and 'b' for the rule  $y = mx + b$ .** You must answer **YES or NO, and** give a brief reason for your answer. Write the answer neatly below.

|   |   |   |   |   |    |
|---|---|---|---|---|----|
| x | 0 | 1 | 2 | 3 | 4  |
| y | 1 | 2 | 4 | 7 | 10 |

$$\begin{aligned} 2 - 1 \\ = 1 \end{aligned}$$

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You will score the maximum of **2 marks** if you recognise and explain the pattern for how much each y-value changes and explain your answer. You will score **1 mark** if you recognise and explain the pattern for how much each y-value changes or explain your answer. Incorrect or no answer scores **0 marks**.

*These answers should be written as full sentences using appropriate mathematical terms*