# Using tables to explore patterns and graphs

Mana Maths

# Te reo Māori terms

**tēpara**
table
Open in Te Aka

**hikuaua**
pattern
Open in Te Aka

**kauwhata**
graph
Open in Te Aka

**hātepe**
sequence
Open in Te Aka

# Using tables to explore patterns and graphs — Foundation

Complete each table, then use the pattern to describe the graph or write the next value.

**1.** For the rule $y = x + 2$, complete the table.

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

**2.** For the rule $y = 2x$, complete the table.

| $x$ | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $y$ | 2 | | | | |

**3.** For the rule $y = 5 - x$, complete the table.

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

**4.** The table follows the rule $y = x + 4$. Write the missing values.

| $x$ | 2 | 4 | 6 | 8 |
|---|---|---|---|---|
| $y$ | | | | |

**5.** The table follows the rule $y = 3x$. Write the missing values.

| $x$ | 0 | 2 | 4 | 6 |
|---|---|---|---|---|
| $y$ | | | | |

**6.** The table follows the rule $y = 10 - 2x$. Write the missing values.

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

**7.** Use the table to write the next ordered pair.

| $x$ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $y$ | 4 | 5 | 6 | 7 |

**8.** Use the table to write the next ordered pair.

| $x$ | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| $y$ | 0 | 2 | 4 | 6 |

**9.** Use the table to write the next ordered pair.

| $x$ | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| $y$ | 9 | 8 | 7 | 6 |

**10.** The points are $(0, 1)$, $(1, 3)$, $(2, 5)$, $(3, 7)$. Make a table and write the rule connecting $x$ and $y$.

**11.** The points are $(1, 2)$, $(2, 4)$, $(3, 6)$, $(4, 8)$. Which point comes next, and would the graph rise or fall from left to right?

**12.** A table gives $(0, 6)$, $(1, 5)$, $(2, 4)$, $(3, 3)$. Which point comes next, and would the graph rise or fall from left to right?

# Using tables to explore patterns and graphs — Proficient

Use each table to find a rule, extend the pattern, or predict what the graph would look like.

**1.** Find the rule and write the next value of $y$.

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

**2.** Find the rule and write the next value of $y$.

| $x$ | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| $y$ | 8 | 6 | 4 | 2 |

**3.** Find the rule and write the next value of $y$.

| $x$ | 0 | 2 | 4 | 6 |
|---|---|---|---|---|
| $y$ | 3 | 7 | 11 | 15 |

**4.** Complete the table for $y = 4x - 1$. Then write the ordered pair for $x = 5$.

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

**5.** Complete the table for $y = 12 - 3x$. Then decide whether the graph rises or falls.

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

**6.** Complete the table for $y = 0.5x + 1$. Then write the ordered pair for $x = 8$.

| $x$ | 0 | 2 | 4 | 6 |
|---|---|---|---|---|
| $y$ | | | | |

**7.** A table shows $(0, 2)$, $(1, 5)$, $(2, 8)$, $(3, 11)$. Write the rule and say whether the graph is a straight line or not.

**8.** A table shows $(1, 9)$, $(2, 7)$, $(3, 5)$, $(4, 3)$. Write the rule and predict the $x$-intercept.

**9.** A pattern has rule $y = 2x + 3$. Which is larger: the value when $x = 7$ or the value when $x = 10$? By how much?

**10.** A pattern has rule $y = 15 - x$. Write three ordered pairs and describe the slope in words.

**11.** The table is $(0, 0)$, $(1, 1)$, $(2, 4)$, $(3, 9)$. Is the graph likely to be a straight line or a curve? Explain from the table.

**12.** The table is $(0, 5)$, $(2, 9)$, $(4, 13)$, $(6, 17)$. Write a rule that matches the pattern and then write the point for $x = 8$.

# Using tables to explore patterns and graphs — Excellence

Use table patterns to justify rules, compare graphs, and predict unknown values.

**1.** The table is $(0, 4)$, $(1, 7)$, $(2, 10)$, $(3, 13)$. Write the rule, then explain how the table shows the graph has constant gradient.

**2.** The table is $(1, 12)$, $(2, 9)$, $(3, 6)$, $(4, 3)$. Write the rule and predict where the graph crosses the $x$-axis.

**3.** The table is $(0, 1)$, $(1, 4)$, $(2, 9)$, $(3, 16)$. Explain why these points would not lie on one straight line.

**4.** Complete the table for $y = 3x - 5$. Then state both intercepts.

| $x$ | $0$ | $1$ | $2$ | $5$ |
|---|---|---|---|---|
| $y$ | | | | |

**5.** Complete the table for $y = 18 - 2x$. Then decide whether the graph reaches $y = 0$ before or after $x = 10$.

**6.** A machine rule makes the table $(0, 2)$, $(2, 6)$, $(4, 10)$, $(6, 14)$. Write the rule in the form $y = mx + c$.

**7.** Two tables are shown. Table A: $(0,1)$, $(1,3)$, $(2,5)$. Table B: $(0,1)$, $(1,4)$, $(2,7)$. Which graph is steeper? Explain using the change in $y$.

**8.** A student says the table $(0,7)$, $(1,5)$, $(2,3)$, $(3,1)$ has rule $y = 7 - 2x$. Check the rule using the table, then find the point for $x = 5$.

**9.** The table is $(0,-1)$, $(1,2)$, $(2,5)$, $(3,8)$. Predict the point where $y = 14$. Show the pattern you used.

**10.** The points in a table are $(0,10)$, $(5,8)$, $(10,6)$, $(15,4)$. Describe the graph and find a rule that fits these values.

**11.** A graph is made from the rule $y = \frac{3}{2}x + 1$. Write a table for $x = 0, 2, 4, 6$, then explain why these values are useful for plotting.

**12.** The table is $(1,3)$, $(2,6)$, $(3,11)$, $(4,18)$. The first differences are not constant. What does that suggest about the graph?

**13.** One pattern uses $y = 2x + 1$. Another uses $y = 2x + 5$. Explain how the tables would show the graphs are parallel.

**14.** The table for a line includes $(2, 9)$ and $(5, 15)$. Find the gradient from the table, then write a rule for the line.