Year 8 Sequences, Functions and Graphs – Challenge

ANSWER KEY HappyKids.fit

Answers and worked solutions · 8 questions

A. Think like a mathematician

1. **at x = 3 (y = 27): both cost $27 for 3 hours; company A for 6 hours ($39 against $54)**
   4x + 15 = 9x, so 5x = 15, x = 3
   For 6 hours: A = 39, B = 54
   After the intersection, the line with the smaller gradient is lower

2. **The second part is steeper: water flows in faster when both taps are on, so the depth rises faster.**
   Think about what each axis measures
   the second part is steeper
   water flows in faster when both taps are on, so the depth rises faster

3. **The time when both candles are the same height: after that, candle A is shorter because its line is steeper downwards.**
   Think about what each axis measures
   the time when both candles are the same height
   after that, candle A is shorter because its line is steeper downwards

4. **Yes. Substitute x = 2: y = 3 × 2 − 2 = 4, so (2, 4) is on the line.**
   Substitute or rearrange
   Substitute x = 2: y = 3 × 2 − 2 = 4, so (2, 4) is on the line.
   Decide

5. **Yes. It crosses the y-axis at (0, 0), so c = 0 and the equation is y = mx.**
   Substitute or rearrange
   It crosses the y-axis at (0, 0), so c = 0 and the equation is y = mx.
   Decide

6. **No. y = 5 − 2x = −2x + 5, so the gradient is −2 and the y-intercept is 5.**
   Substitute or rearrange
   y = 5 − 2x = −2x + 5, so the gradient is −2 and the y-intercept is 5.
   Decide

7. **Going up by 5 each time means 5n, not n + 5. The nth term is 5n + 4.**
   Error: the difference gives the coefficient of n
   5n gives 5, 10, 15, ...
   Adjust: 5n + 4

8. **The gradient is the coefficient of x: y = 4x + 4, so the gradient is 4 and the y-intercept is 4.**
   Error: the gradient and intercept were swapped
   Rewrite as y = 4x + 4
   gradient 4, y-intercept 4