Testing parameter changes digitally

6 questions | 16 marks

Equivalent correct methods earn the corresponding marks.

1. Complete the outputs for $y = x + 2$ and $y = x - 1$ at $x = -1, 0, 1$. [3 marks]

Substitute each input into both rules.

The first output is always 3 greater.

Answer: First rule: 1, 2, 3. Second rule: $-2, -1, 0$.

2. Predict the change from $y = 4x - 2$ to $y = 4x + 5$ without plotting. [2 marks]

The gradients are equal.

The intercept increases by $5 - (-2) = 7$.

Answer: A shift up 7 units; the lines are parallel.

3. Where do $y = -x + 3$, $y = 2x + 3$ and $y = 5x + 3$ all meet? Explain. [2 marks]

For $x = 0$, the mx term is zero in each rule.

All three rules then give $y = 3$.

Answer: $(0, 3)$

4. For $y = mx + 2$, which value $m = 1$ or $m = 3$ gives the larger output at $x = -2$? Show both values. [3 marks]

For $m = 1$, $y = -2 + 2 = 0$.

For $m = 3$, $y = -6 + 2 = -4$.

Answer: $m = 1$ gives 0, which is larger than -4 for $m = 3$.

5. Design two distinct lines that meet at $(0, -1)$, then verify the common point. [3 marks]

Choose different gradients with the same intercept -1.

Substituting $x = 0$ gives $y = -1$ in both.

Answer: For example, $y = 2x - 1$ and $y = -x - 1$.

6. A graphing screen suggests $y = 0.5x + 2$ and $y = 0.5x + 2.1$ are the same line. Explain how to check. [3 marks]

The same gradient means they are parallel.

The different intercepts show they are not the same line.

A large viewing window can hide a small separation.

Answer: Compare exact equations or substitute $x = 0$: the outputs are 2 and 2.1, so the lines are distinct and parallel.