Graphical solutions and intersection checks

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Verify that $(1, 4)$ lies on $y = 3x + 1$ and $y = x + 3$. [2 marks]

First output: $3 + 1 = 4$.

Second output: $1 + 3 = 4$.

Answer: It lies on both.

2. Find the intersection of $y = x + 1$ and $y = 3$. [2 marks]

Solve $x + 1 = 3$.

Then x = 2 and y = 3.

Answer: $(2, 3)$.

3. Find the intersection of $y = 2x$ and $y = x + 2$. [2 marks]

Set $2x = x + 2$, giving x = 2.

The shared output is 4.

Answer: $(2, 4)$.

4. Find the intersection of $y = -x + 5$ and $y = x + 1$. [2 marks]

Set $-x + 5 = x + 1$, giving $2x = 4$.

Substitute x = 2 to get y = 3.

Answer: $(2, 3)$.

5. A crossing of $y = 2x + 1$ and $y = x + 3$ is read as $(2, 6)$. Use checks to assess this. [3 marks]

Both rules give 5 at x = 2.

The proposed x works, but the y-reading is one unit too high.

Answer: The correct point is $(2, 5)$.

6. Can $y = 2x + 1$ and $y = 2x - 3$ intersect? Explain. [3 marks]

At every input the first output is 4 larger.

The graphs are parallel distinct lines.

Answer: No.