One/no/infinite solutions

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Classify the solution set of $y = 2x + 3$ and $y = -x + 6$. [2 marks]

The gradients differ.

Answer: One solution.

2. Classify $x - y = 4$ and $2x - 2y = 8$. [2 marks]

The second equation is twice the first.

Answer: Infinitely many points on $x - y = 4$.

3. Classify $3x + y = 7$ and $6x + 2y = 9$. [2 marks]

Doubling the first would give right side 14, not 9.

Answer: No solution.

4. Explain why $0 = 0$ does not mean that every pair of real numbers solves $x + y = 2$ and $2x + 2y = 4$. [3 marks]

For example, $(0, 0)$ fails the original equation although the equations are dependent.

Answer: The original condition $x + y = 2$ still applies.

5. Find the value of k for which $y = 3x + 5$ and $y = 3x + k$ have infinitely many solutions. [2 marks]

Their intercepts must match.

Answer: $k = 5$

6. Two taxi companies charge the same 2 dollars per kilometre. Their starting fees are 4 and 7 dollars. Can the trip prices ever be equal for the same distance? [3 marks]

The models are parallel lines separated by 3 dollars for every distance.

Answer: No.