Simultaneous linear equations and intersection models

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Solve $y = 3x + 1$ and $y = x + 9$. [2 marks]

Set 3x+1=x+9 to obtain x=4, then y=13.

Answer: $(4, 13)$

2. Solve $2x + y = 11$ and $x - y = 1$. [2 marks]

Add equations: 3x=12, then y=3.

Answer: $(4, 3)$

3. Solve $3x + 2y = 4$ and $x - y = 3$. [2 marks]

Use x=y+3: 3y+9+2y=4, so y=-1 and x=2.

Answer: $(2, -1)$

4. Classify $y = 2x + 1$ and $4x - 2y = 6$ by their number of simultaneous solutions. [2 marks]

The second is y=2x-3: distinct parallel lines.

Answer: No solutions.

5. Classify $x + 2y = 5$ and $3x + 6y = 15$. [2 marks]

The second is three times the first; both describe one line.

Answer: Infinitely many solutions.

6. Plan A costs 18 dollars plus 4 dollars per visit; Plan B costs 6 dollars plus 7 dollars per visit. At what number of visits are their costs equal? [2 marks]

Solve 18+4v=6+7v to obtain v=4.

Check both original costs.

Answer: 4 visits; both cost 34 dollars.