None, One or Infinitely Many

SY07-V1 · storyboard · SY07 None, one or infinitely many solutions. Read each picture with its sentences.

Picture 1

How many solutions has $x + 2y = 5$, $2x + 4y = 7$?

$2x + 4y = 10$ first $\times 2$

$0 = 3$ subtract the second

Never true: no solution

$2x + 4y$ can't be 10 and 7

1. How many solutions has x + 2y = 5, 2x + 4y = 7?
2. Multiply the first equation by two: 2x + 4y = 10.
3. Subtract the second equation: both letters cancel, and 0 = 3.
4. Never true: 2x + 4y can't be ten and seven at once.
5. No solution.

Picture 2

How many solutions has $-u + 3v = 8$, $-2u + 6v = 16$?

$$-2u + 6v = 16 \quad \text{first } \times 2$$

$$\boxed{0 = 0}$$

$$\boxed{u = 3v - 8} \quad \text{describe them}$$

6. Now –u + 3v = 8 and −2u + 6v = 16.
7. Twice the first equation is −2u + 6v = 16: the second equation exactly.
8. Subtracting gives 0 = 0, always true.
9. Infinitely many solutions.
10. Describe them by solving for u: u = 3v − 8.
11. Every pair like that works, such as one, three.

Picture 3

Trap $0 = 0$

$$\times \ (0, 0)$$

$$\checkmark \quad u = 3v - 8$$

12. Watch for the trap: writing zero, zero.
13. Zero equals zero means every pair with u = 3v − 8 works, not the pair zero, zero.