

ELIMINATION

Solve $3x - y = 2$

$5x + y = 14$

Same number at front

Different signs
add equations

$8x = 16$ ← y has been eliminated

$x = 2$

substitute into original

$3x - y = 2$

$3(2) - y = 2$

$6 - y = 2 \rightarrow y = 4$

Final answer: $x = 2, y = 4$

- 2 equations
- 2 variables
- check by substituting
- Take care with negatives

Quadratic

one equation has x^2 or y^2 or both

Solve $x^2 + y^2 = 40$

$x + y = 4 \rightarrow y = 4 - x$

Rearrange to $x =$ or $y =$

Substitute $\rightarrow x^2 + (4 - x)^2 = 40$

$x^2 + 16 - 8x + x^2 = 40$

$2x^2 - 8x + 16 = 40$

$2x^2 - 8x - 24 = 0 \leftarrow \div 2$

Factorise

$2x^2 + 4x - 12x - 24 = 0$

$2x(x+2) - 12(x+2) = 0$

$(2x-12)(x+2) = 0$

$2x - 12 = 0 \quad x + 2 = 0$

$2x = 12$

$x = 6$

$x + 2 = 0$

← solve values

Substitute

$x + y = 4$ original equation

$x = 6$

$6 + y = 4$

$y = -2$

$x = -2$

Final Answer

$x = 6$ and $y = -2$

$x = -2$ and $y = 6$

SIMULTANEOUS EQUATIONS

Substitute one equation is $x =$ or $y =$

Solve $2x + y = 3$

$x = y + 3$

Substitute x into top equation

$2(y+3) + y = 3$

$2y + 6 + y = 3$

$3y + 6 = 3$

$x = y + 3$

$x = -1 + 3$

$x = 2$

Final Answer $x = 2, y = -1$

Substitute $x = 2$ into top equation

$2(2) + y = 3$

$4 + y = 3$

$y = -1$

Final Answer

$x = 6$ and $y = -2$

$x = -2$ and $y = 6$

Set Equal
(Both eqns have the same subject)

Solve $y = 3x - 2$

Set equal $y = x + 6$

$3x - 2 = x + 6$

Solve $2x - 2 = 6$

$2x = 8$

$x = 4$

Substitute $y = x + 6$

$y = 4 + 6$

$y = 10$

Final Answer $x = 4, y = 10$