

2.5.2 Simultaneous

Name: _____ Class: _____ Date: _____

KEY WORDS elimination

<!-- Session 2 native-skill companion -->

Objective

Practise simultaneous within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Two linear simultaneous equations · Foundation

Multiply equations to make a variable cancel, or substitute an expression from one equation into the other. Solve the remaining linear equation and recover the second variable. The intersection is a point satisfying both original equations.

$$x + y = 12, \quad 3x + 2y = 31$$

For $x+y=12$ and $3x+2y=31$, subtract twice the first equation from the second: $x=7$. Then $y=5$. Check both $7+5=12$ and $3 \times 7 + 2 \times 5 = 31$. The two straight-line graphs meet at (7,5).

Check the ordered pair in both original equations. Multiplying an equation means multiplying every term, including the constant. Parallel distinct lines have no common solution.

AQA A19 Foundation solves two linear equations by elimination or substitution and interprets the graph intersection. Linear/quadratic systems belong to Higher.

■ Linear and linear/quadratic simultaneous equations · Higher

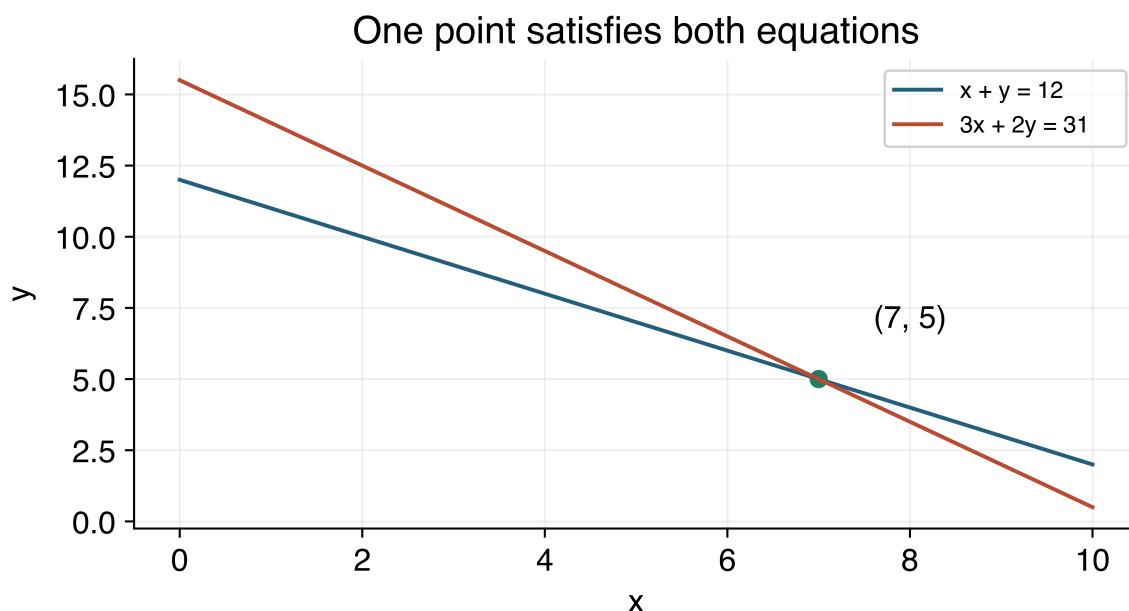
For two linear equations, use elimination or substitution and check both equations. For a line and a quadratic, substitute the linear relation first; then solve the resulting quadratic. For inequalities, shade the region satisfying every condition.

$$x + y = 12, \quad 3x + 2y = 31$$

For $x+y=12$ and $3x+2y=31$, subtract twice the first equation to obtain $x=7, y=5$. For $y=x+2$ and $y=x^2$, equate outputs: $x^2-x-2=0$, hence $x=2$ or -1 . The intersections are (2,4) and (-1,1), and both satisfy the line and parabola.

One equation checked is not enough. A line can meet a quadratic twice, so retain both solutions unless the context removes one. Inequality boundaries may be included or excluded according to the sign.

AQA A19 Higher includes two linear equations and linear/quadratic systems. Elimination suits linear pairs; substitution reduces a line/curve pair to a quadratic. Retain every solution and check both original equations.



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) Solve $x + y = 12$ and $3x + 2y = 31$. Find x .

2.2 (Foundation) For those equations, find y .

2.3 (Foundation) In $x+y=12$, find y when $x=7$.

2.4 (Higher) Find the larger x -coordinate where $y=x+1$ meets $y=x^2-1$.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: A pair of simultaneous equations is solved by checking just one of them.

Solutions

2.1 Subtract twice $x+y=12$ from $3x+2y=31$: $x=31-24=7$.

2.2 Use $x+y=12$, so $y=12-7=5$.

2.3 The first equation gives $x+y=12$; substitute $x=7$ to obtain $y=5$.

2.4 Equate the graphs: $x^2-x-2=(x-2)(x+1)=0$. The larger root is 2.

3.1 False. The point $(0,12)$ satisfies $x+y=12$ but not $3x+2y=31$. The solution $(7,5)$ satisfies both equations: $7+5=12$ and $21+10=31$.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.