

Chapter 3 – Equations and inequalities

? Example 1 – Solving linear simultaneous equations by elimination

Solve the simultaneous equations:

a. $2x + 3y = 8$
 $3x - y = 23$

b. $4x - 5y = 4$
 $6x + 2y = 25$

? Example 2 – Solving linear simultaneous equations by substitution

Solve the simultaneous equations:

$x - y = 1$
 $4x + 2y = -30$

? Example 3 – Solving simultaneous equations by substitution

Solve the simultaneous equations:

$2x + 2y = 3$
 $x^2 + 3xy = 10$

? Example 4 – Linear simultaneous equations on graphs

a. On the same axes, draw the graphs of:

$2x + 3y = 8$
 $3x - y = 23$

b. Use your graph to write down the solutions to the simultaneous equations.

? Example 5 – Non-linear simultaneous equations on graphs

a. On the same axes, draw the graphs of:

$2x + y = 3$
 $y = x^2 - 3x + 1$

b. Use your graph to write down the solutions to the simultaneous equations.

? Example 6 – Non-linear simultaneous equations on graphs

The line with equation $y = 2x + 1$ meets the curve with equation $kx^2 + 2y + (k - 2) = 0$ at exactly one point. Given that k is a positive constant

- a. find the value of k
b. for this value of k , find the coordinates of the point of intersection.

? Example 7 – Linear inequalities

Find the set of values of x for which:

a. $5x + 9 \geq x + 20$ b. $12 - 3x < 27$ c. $3(x - 5) > 5 - 2(x - 8)$

? Example 8 – Linear inequalities

Find the set of values of x for which:

a. $3x - 5 < x + 8$ and $5x > x - 8$ b. $x - 5 > 1 - x$ or $15 - 3x > 5 + 2x$

? Example 9 – Quadratic inequalities

Find the set of values of x for which:

$3 - 5x - 2x^2 < 0$

? Example 10 – Quadratic inequalities

- a. Find the set of values of x for which $12 + 4x > x^2$
b. Hence find the set of values for which $12 + 4x > x^2$ and $5x - 3 > 2$

? Example 11 – Non-linear inequalities

Find the set of values for which $\frac{6}{x} > 2$, $x \neq 0$

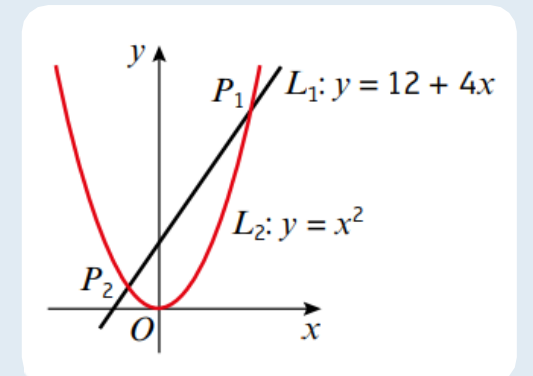
? Example 12 – Inequalities and simultaneous equations

L_1 has equation $y = 12 + 4x$.

L_2 has equation $y = x^2$.

The diagram shows a sketch of L_1 and L_2 on the same axes.

- a. Find the coordinates of P_1 and P_2 , the points of intersection.
b. Hence write down the solution to the inequality $12 + 4x > x^2$.



? Example 13

On graph paper, shade the region that satisfies the inequalities:

$y \geq -2$, $x < 5$, $y \leq 3x + 2$ and $x > 0$.

? Example 14 – Non-linear equalities and regions of graphs

On graph paper, shade the region that satisfies the inequalities:

$2y + x < 14$
 $y \geq x^2 - 3x - 4$