3A Linear Simultaneous Equations

1. Solve the following Simultaneous Equations by Elimination

$$2x + 3y = 8$$

$$3x - y = 23$$

2. Solve the following Simultaneous Equations by Substitution

$$2x - y = 1$$

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

3B Non-Linear Simultaneous Equations

1. Solve the following Simultaneous Equations

$$x + 2y = 3$$

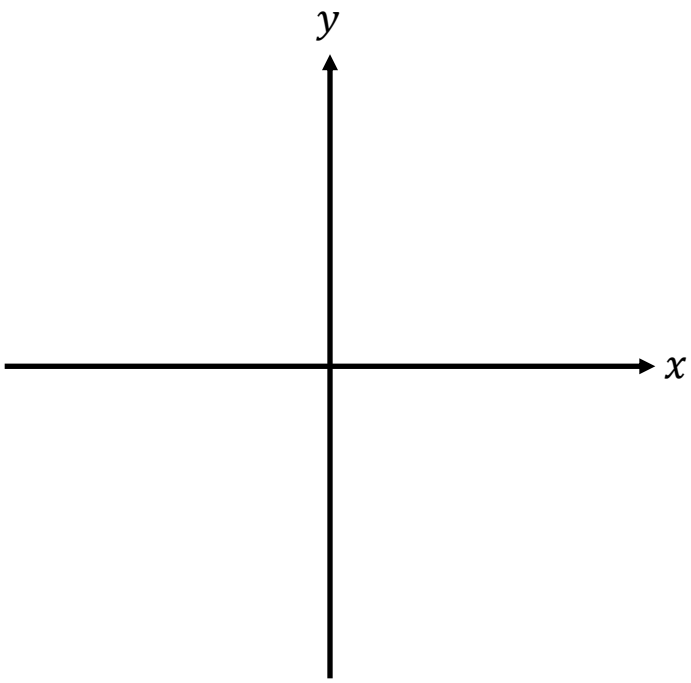
$$x^2 + 3xy = 10$$

3C Simultaneous Equations Graphically (With the Discriminant)

1. Draw the graphs of the following equations and use it to write down their solution:

$$2x + 3y = 10$$

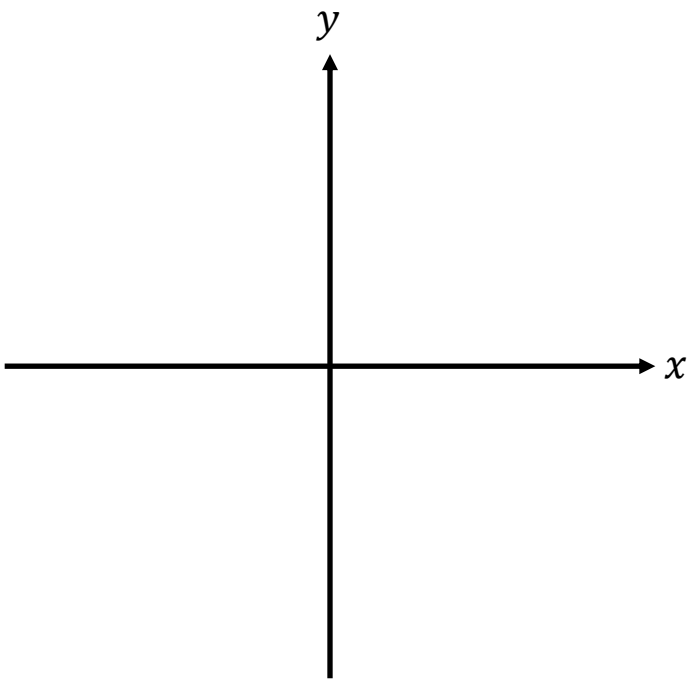
$$3x - y = 4$$



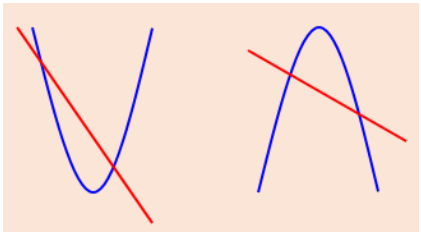
1. Draw the graphs of the following equations and use it to write down their solution:

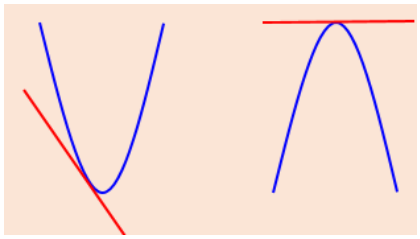
$$2x + y = 3$$

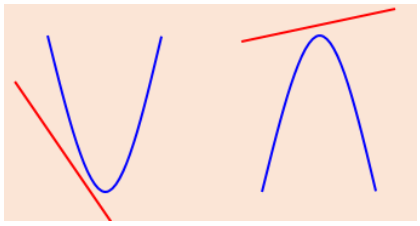
$$y = x^2 - 3x + 1$$



Notes on the discriminant:







2. 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

3D Linear Inequalities

1. Find the set of values of x for which:

a) $2x - 5 < 7$

b) $5x + 9 \geq x + 20$

c) $12 - 3x < 27$

d) $3(x - 5) > 5 - 2(x - 8)$

2. Find the set of values of x for which:

a) $3x - 5 < x + 8$ and $5x > x - 8$

b) $x - 5 > 1 - x$ and $15 - 3x > 5 + 2x$

c) $4x + 7 > 3$ and $17 < 11 + 2x$

3E Quadratic Inequalities

1. $x^2 - 4x - 5 < 0$

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

3. Find the values of k for which the equation:

$$(k+3)x^2 + 6x + k - 5 = 0$$

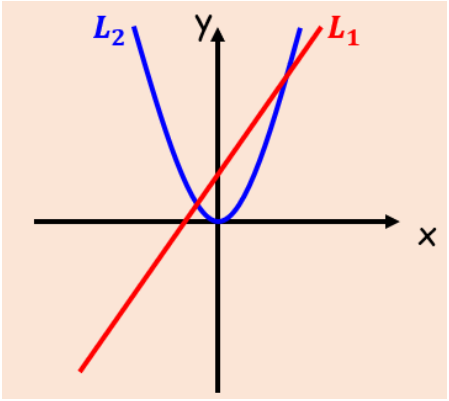
has two real roots.

4. Find the set of values for which:

$$\frac{6}{x} > 2$$

3F Interpreting Graphical Non-Linear Inequalities

1. L_1 has equation $y = 12 + 4x$
   L_2 has equation $y = x^2$
   The diagram below shows a sketch of L_1 and L_2 on the same axes.



a) Find the coordinates of the points of intersection

b) Hence write down the solution to the inequality $12 + 4x > x^2$

3G Shading Inequality Regions

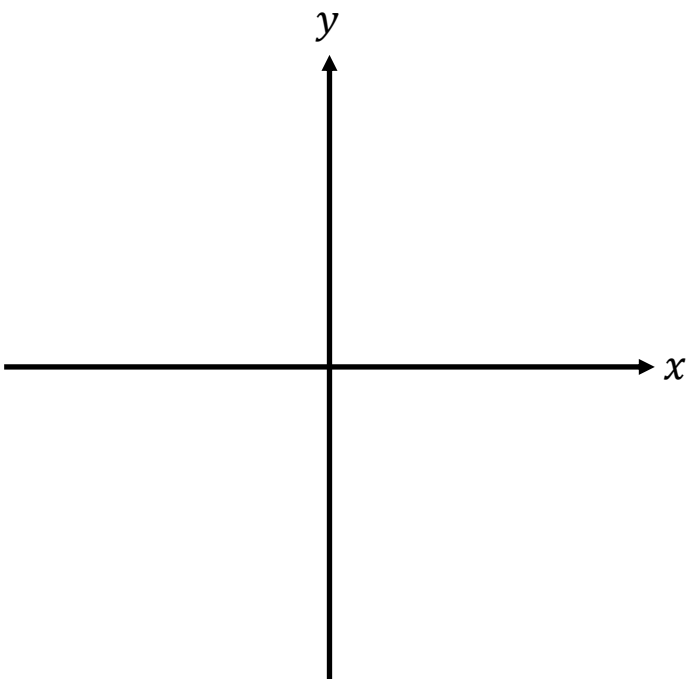
1. On graph paper, show the region that satisfies the following inequalities:

$$y \geq -2$$

$$x < 5$$

$$y \leq 3x + 2$$

$$x > 0$$



2. On graph paper, show the region that satisfies the following inequalities:

$$2y + x < 14$$

$$y > x^2 - 3x - 4$$