A-Level Starter Activity

Jonwa Maths

Topic: Solving Linear Simultaneous Equations

Chapter Reference: Pure 1, Chapter 3

8 minutes

1. Solve the following simultaneous equations,

$2y = x + 6$

$y = 2x - 3$ **(3)**

2. Solve the following simultaneous equations,

$3x - 2y = 9$

$x + 4y = 10$ **(3)**

3. Solve the following simultaneous equations,

$5x + 4y = 3$

$x - 2y = 2$ **(3)**

Solutions

1.

$2y = x + 6$ $y = 2x - 3$	**M1**
$2(2x – 3) = x + 6$ $4x – 6 = x + 6$ $3x = 12$ $x = 4$	**M1**
$y = 2(4) – 3$ $y = 5$	**M1**

2.

$3x – 2y = 9$ $x + 4y = 10$	**M1**
$x = 10 – 4y$ $3(10 – 4y) – 2y = 9$ $30 – 14y = 9$ $14y = 21$ $y = 1.5$	**M1**
$x + 4(1.5) = 10$ $x = 4$	**M1**

3.

$5x + 4y = 3$ $x – 2y = 2$	**M1**
$x = 2 + 2y$ $5(2 + 2y) + 4y = 3$ $10 + 10y + 4y = 3$ $14y = -7$ $y = -\frac{1}{2}$	**M1**
$x = 2y + 2$ $x = (2 \times -\frac{1}{2}) + 2$ $x = 1$	**M1**

A-Level Starter Activity

Jotnwa Maths

Topic: Quadratic and Linear Inequalities

Chapter Reference: Pure 1, Chapter 3

8 minutes

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

a. $3(x - 2) < 8 - 2x$ **(2)**

b. $(2x - 7)(1 + x) < 0$ **(3)**

c. Both $3(x - 2) < 8 - 2x$ and $(2x - 7)(1 + x) < 0$ **(1)**

2. Find the coordinates of the points of intersection of the curve $y = 12 - x - x^2$ and the line $3x + y = 4$ **(5)**

Solutions

1a.

$3(x - 2) < 8 - 2x$ $3x - 6 < 8 - 2x$ $5x < 14$	**M1**
$x < \frac{14}{5}$	**M1**

1b.

$(2x - 7)(1 + x) < 0$ $x = \frac{7}{2}$	**M1**
$x = -1$	**M1**
$-1 < x < \frac{7}{2}$	

1c.

$-1 < x < \frac{14}{5}$	**M1**

2.

$4 - 2x = 12 - x - x^2$ $x^2 - 2x - 8 = 0$ $(x - 4)(x + 2) = 0$	**M1**
$x = 4$ $y = 4 - 3(4) = -8$	**M1**
$x = -2$ $y = 4 - 3(-2) = 10$	**M1**

A-Level Starter Activity

Jotnwa Maths

Topic: Drawing Quadratic Inequalities

Chapter Reference: Pure 1, Chapter 3

8 minutes

1. Draw the graph of $x^2 + 11x + 28 \leq 0$ and indicate the solutions of x. **(4)**

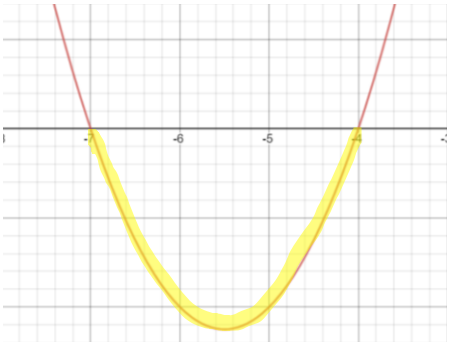
2. Draw the graph of $3x^2 + 2x - 5 > 0$ and indicate the solutions of x. **(3)**

Solutions

1.

$x^2 + 11x + 28 \leq 0$ $(x + 7)(x + 4) = 0$	**M1**
$x = -7$ $x = -4$	**M1**

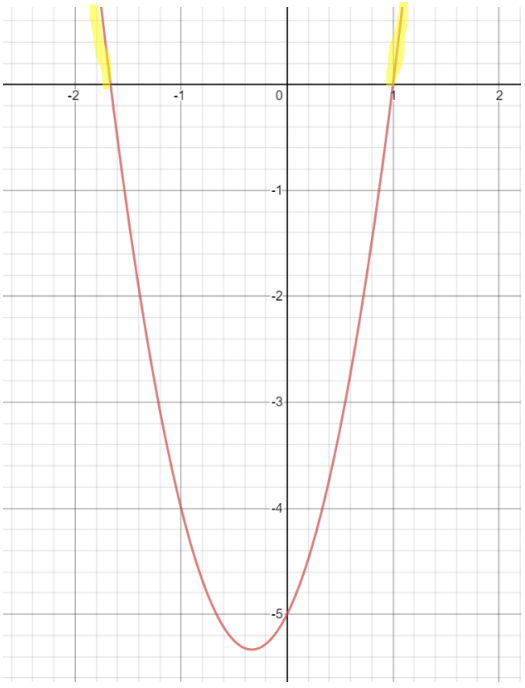
Shape **M1**
Solutions are points below the x-axis **M1**
$-4 \leq x \leq -7$



2.

$3x^2 + 2x - 5 = 0$ $(3x + 5)(x - 1)$	**M1**
$x = -\frac{5}{3}$ $x = 1$	**M1**

Shape **M1**
Solutions are points above the x-axis **M1**
$x > -\frac{5}{3}$
$x > 1$



A-Level Starter Activity

Jonwa Maths

Topic: Solving Quadratic Simultaneous Equations

Chapter Reference: Pure 1, Chapter 3

8 minutes

1.Solve the following simultaneous equations,

$y - 3x = 4$

$x^2 + y^2 = 34$ **(5)**

2. Solve the following simultaneous equations,

$x = 3 + 2y$

$x^2 + 2y^2 = 27$ **(5)**

Solutions

1.

$y = 4 + 3x$ $x^2 + (4 + 3x)(4 + 3x) = 34$ $x^2 + 16 + 12x + 12x + 9x^2 = 34$ $10x^2 + 24x - 18 = 0$	**M1**
$5x^2 + 12x - 9 = 0$ $(x + 3)(5x - 3) = 0$	**M1**
$x = -3$ $x = \frac{3}{5}$	**M1**
When $x = -3$, $y = 4 + 3(-3)$ $y = -5$	**M1**
When $x = \frac{3}{5}$, $y = 4 + 3(\frac{3}{5})$ $y = 5\frac{4}{5}$	**M1**

2.

$(3 + 2y)^2 + 2y^2 = 27$ $(3 + 2y)(3 + 2y) + 2y^2 = 27$ $9 + 4y^2 + 6y + 6y + 2y^2 = 27$	**M1**
$6y^2 + 12y - 18 = 0$ $y^2 + 2y - 3 = 0$	**M1**
$(y - 1)(y + 3) = 0$ $y = 1$ $y = -3$	**M1**
When $y = 1$, $x = 3 + 2(1)$ $x = 5$	**M1**
When $y = -3$, $x = 3 + 2(-3)$ $x = -3$	**M1**