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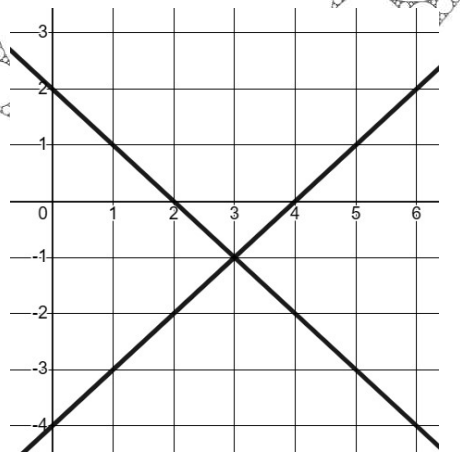
A LEVEL MATHS

# (14) Graphing Simultaneous Equations

## WORKING AT D/E

(1) The diagram below shows the graphs of

$y = 2 - x$ and $y = x - 4$




**Use the graphs** to solve the simultaneous equations

$$y = 2 - x$$
$$y = x - 4$$

(2) By sketching the graphs of $y = x^2 + 2$ and $y = 1 - x^2$ on the same set of axes, show that there are no solutions to the simultaneous equations

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

## WORKING AT B/C

(1) Sketch the graphs of $y = 4 - x^2$ and $x + y = 3$ on the same set of axes to find the number of solutions to the simultaneous equations:

$$y = 4 - x^2$$
$$x + y = 3$$

(2) (a) Sketch the graphs of $x^2 + y^2 = 50$ and $y = -x$ on the same set of axes.

(b) Use algebra to shows the points of intersection of the two graphs have integer solutions.

(3) By considering the discriminant, state the number of times the graphs of $x^2 - y = 3$ and $y = 5 - x$ meet or intersect.

## WORKING AT A*/A

(1) The graph of $x^2 + y^2 = 30$ has a tangent with equation $y = 2x + k$ where $k$ is a constant. Show that $k = \pm 5\sqrt{6}$

(2) The graphs of $y = 3x^2 + k$ and the line with equation $y = mx$ where $k$ and $m$ are constants do not intersect. Explain clear why:

$$-2\sqrt{3k} < m < 2\sqrt{3k}$$

(3) The height $(h)$ metres of a rocket above the launch pad after $(t)$ seconds can be modelled by the equation $h = -2t^2 + kt$ where $k$ is a constant and $t \geq 0$. Find the value of $k$ such that the maximum height of the rocket is 30 metres above the launch pad. Given your answer in exact form.