

## (13) Linear & Non-Linear Simultaneous Equations

### WORKING AT D/E

(1) Solve the simultaneous equations

$$y = x^2 + 5x - 13$$

$$y = 2x - 3$$

(2) Solve the simultaneous equations using the method of substitution

$$y = x - 1$$

$$xy = 6$$

(3) Solve the simultaneous equations

$$y = x$$

$$x^2 + y^2 = 72$$

### WORKING AT B/C

(1) Solve the simultaneous equations

$$2y + x = 10$$

$$xy = 8$$

(2) Solve the simultaneous equations

$$3y + 5x = 7$$

$$x^2 + y^2 = 5$$

(3) Show that there are no solutions to the simultaneous equations

$$y = 3$$

$$(x - 8)^2 + (y + 7)^2 = 4$$

### WORKING AT A\*/A

(1) A circle with centre (0,0) and radius  $5\sqrt{2}$  and a line with gradient -1 passing through (0,0) meet at the points (a, b) and (c, d) where  $a < c$ . Find the values of a, b, c and d.

(2) Solve the simultaneous equations

$$xy = 2y^2 - 30$$

$$2x + 3y = 13$$

Giving any non-integer answers as exact fractions in their simplest form.

(3) A square has side length  $p$  and area of  $q$ . Given that the perimeter of the square is  $\frac{2q}{3}$ , show that the length of the diagonal of the square can be written in the form  $a\sqrt{b}$  where  $a$  and  $b$  are integers to be determined.