Linear and Quadratic

Example:

Solve the simultaneous equations:

$$x + 2y = 3$$

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

Test Your Understanding:

1. Solve the simultaneous equations: $3x^2 + y^2 = 21$ and $y = x + 1$

Extension:

1.

[MAT 2012 1G] There are *positive* real numbers x and y which solve the equations $2x + ky = 4, x + y = k$ for:
A) All values of k;
B) No values of k;
C) $k = 2$ only;
D) Only $k > -2$

2. *[STEP 2010 Q1]* Given that

$$5x^2 + 2y^2 - 6xy + 4x - 4y \equiv a(x - y + 2)^2 + b(cx + y)^2 + d$$

a) Find the values of a, b, c, d.
b) Solve the simultaneous equations:

$$5x^2 + 2y^2 - 6xy + 4x - 4y = 9$$
$$6x^2 + 3y^2 - 8xy + 8x - 8y = 14$$

(Hint: Can we use the same method in (a) to rewrite the second equation?)