**1.** Find the value of

**1.**

(*a*) ,

**(1)**

(*b*) .

**(2)**

**4.** Solve the simultaneous equations

 *x* + *y* = 2

4*y*2 – *x*2 = 11

 **(7)**

**7.** f(*x*) = *x*2 + (*k* + 3)*x* + *k*,

where *k* is a real constant.

(*a*) Find the discriminant of f(*x*) in terms of *k*.

**(2)**

(*b*) Show that the discriminant of f(*x*) can be expressed in the form (*k* + *a*)2 + *b*, where *a* and *b* are integers to be found.

**(2)**

(*c*) Show that, for all values of *k*, the equation f(*x*) = 0 has real roots.

**(2)**