**11** $\mathrm{f}(x) = x^2 + 6x + 8$

Given that $\mathrm{f}(x)$ can be expressed in the form $(x + A)^2 + B$ where $A$ and $B$ are constants,

(a) find the value of $A$ and the value of $B$.

**(3)**

(b) Hence, or otherwise, find

(i) the value of $x$ for which $\mathrm{f}(x)$ has its least value

(ii) the least value of $\mathrm{f}(x)$.

**(2)**

The curve $C$ has equation $y = x^2 + 6x + 8$

The line $l$, with equation $y = 2 - x$, intersects $C$ at two points.

(c) Find the $x$-coordinate of each of these two points.

**(4)**

(d) Find the $x$-coordinate of the points where $C$ crosses the $x$-axis.

**(2)**

**(Parts (e) and (f) follow on page 30 and 31)**

**Question 11 continued**

**Turn over for parts (e) and (f)**

**Question 11 continued**

The curve $C$ has equation $y = x^2 + 6x + 8$ and the line $l$ has equation $y = 2 - x$

In the space below,

(e) sketch, on the same axes, the curve $C$ and the line $l$.

**(2)**

(f) Find the area of the finite region bounded by the curve $C$ and the line $l$.

**(5)**

**Question 11 continued**

**Question 11 continued**

**(Total for Question 11 is 18 marks)**

**TOTAL FOR PAPER IS 100 MARKS**