Pearson Edexcel

Modelling with quadratics

A LEVEL LINKS
Scheme of work: 1b. Quadratic functions – factorising, solving, graphs and the discriminants

Practice question

1 $f(x) = 6x - x^2 \qquad x \in \mathbb{R}$

Given that $f(x)$ can be written in the form $D(x + E)^2 + F$ where D, E and F are integers,

(a) find the value of D, the value of E and the value of F.

(b) Find

(i) the maximum value of $f(x)$,

(ii) the value of x for which the maximum occurs.

The curve C has equation $y = f(x)$

The curve S has equation $y = x^2 - 4x + 8$

The curve S intersects the curve C at two points.

(c) Find the coordinates of each of these two points.

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Answer

1 (a) $6x - x^2 = -(x^2 - 6x)$

$-(x^2 - 6x) = -\{(x - 3)^2 - 9\}$

$f(x) = -(x - 3)^2 + 9$

$D = -1$
$E = -3$
$F = 9$

(b) (i) $f(x) = 9$
(ii) $x = 3$

(c) (1, 5) and (4, 8)