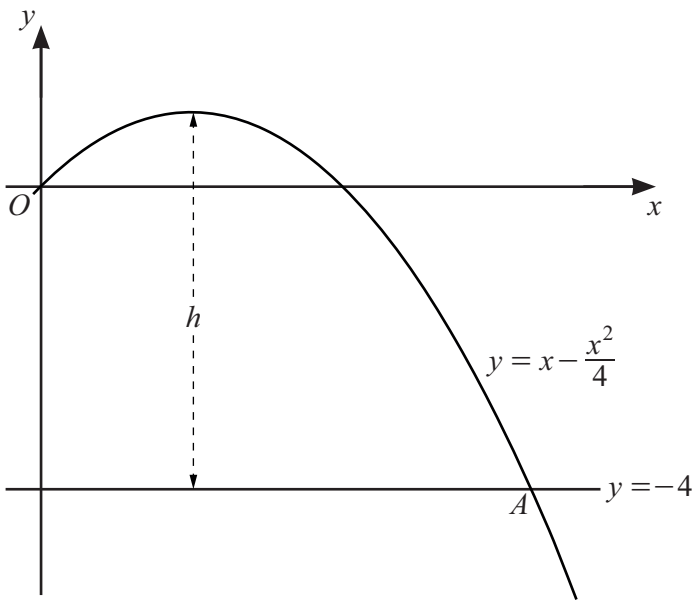
10 The diagram shows part of the curve $y = x - \frac{x^2}{4}$ and the line $y = -4$. The curve and the line intersect at the point A.



(a) The maximum point on the curve is at a perpendicular distance h from the line $y = -4$. Find the value of h. [4]

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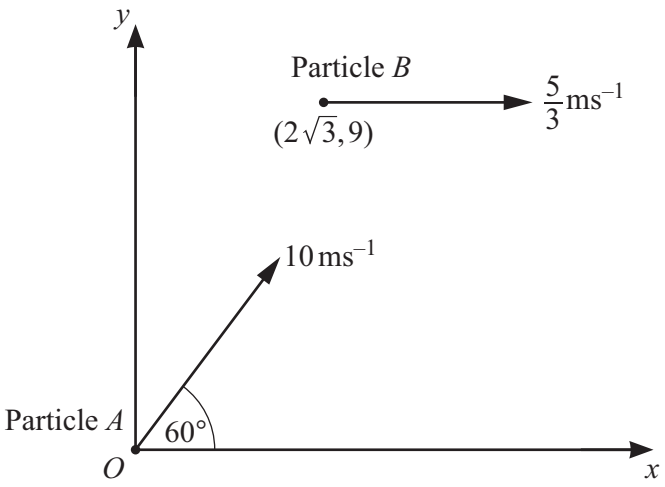
(b) Find the exact x-coordinate of A. [3]

(c) Find the acute angle between the tangent to the curve at A and the line $y = -4$. [4]

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11 In this question **i** is a unit vector in the positive x-direction and **j** is a unit vector in the positive y-direction. Time is in seconds and distances are in metres.

The diagram shows the initial positions and velocities of two particles, A and B, that move in the x-y plane.



Particle A starts from the origin O at time $t = 0$. It moves with constant speed $10\,\text{ms}^{-1}$ in the direction 60° above the x-axis.

(a) Find the exact values of the components of the velocity of particle A in the x-direction and the y-direction. [2]

(b) Find, in terms of t, the position vector of particle A at time t. [1]

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