7 Show that the curve $y = x - \ln(x^2 + 2x)$ has exactly one stationary point.

Find the x-coordinate of this point. [6]

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8 In this question, the units are metres and seconds.

A particle P is travelling in a straight line through a fixed point O.
At time t its acceleration, a, is given by $a = (2t-3)^2$, where $t \geqslant 0$.

When $t = 3$, P has a velocity of 6.

(a) (i) Find an expression for the velocity, v, of P at time t. [3]

(ii) Find the time when P is at rest. [3]

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