7 A curve has equation $y = 2x\cos x$. The normal to the curve at $(\pi, -2\pi)$ meets the x-axis and y-axis at points P and Q. Find the exact area of triangle POQ. [7]

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8 A particle moves in a straight line so that its displacement from a fixed point O at time t seconds is x metres, where $x = t^3 + t^2 - t + 8$ and $t \geqslant 0$.

(a) Find the time when the particle changes direction. [3]

(b) Show that the particle is moving towards O when $t = 0$. [3]

(c) Find the total distance travelled by the particle during the first 2 seconds of its motion. [4]

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