5. A particle P is moving along the x-axis. At time t seconds the displacement of P from the origin O is x metres, where $x = 4\cos\left(\frac{1}{5}\pi t\right)$

(a) Prove that P is moving with simple harmonic motion.

(3)

(b) Find the period of the motion.

(2)

(c) State the amplitude of the motion.

(1)

(d) Find, in terms of π, the maximum speed of P

(2)

The points A and B lie on the x-axis, on opposite sides of O, with $OA = 1.5\,\text{m}$ and $OB = 2.5\,\text{m}$.

(e) Find the time taken by P to move directly from A to B.

(4)

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