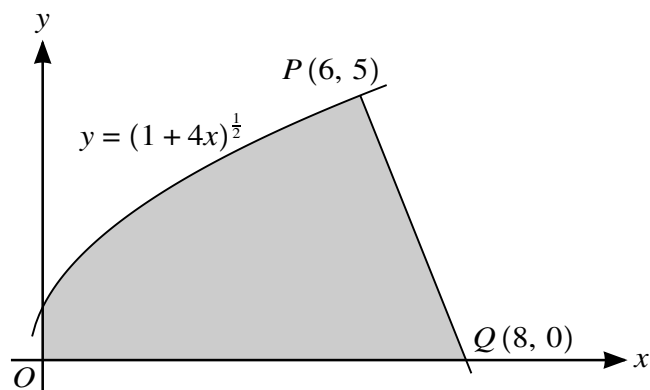


11



The diagram shows part of the curve $y = (1 + 4x)^{\frac{1}{2}}$ and a point $P(6, 5)$ lying on the curve. The line PQ intersects the x -axis at $Q(8, 0)$.

(i) Show that PQ is a normal to the curve. [5]

(ii) Find, showing all necessary working, the exact volume of revolution obtained when the shaded region is rotated through 360° about the x -axis. [7]

[In part (ii) you may find it useful to apply the fact that the volume, V , of a cone of base radius r and vertical height h , is given by $V = \frac{1}{3}\pi r^2 h$.]