

**8** A curve has equation  $y = kx^{\frac{3}{2}}$  where  $k$  is a constant.

The point  $P$  on the curve has  $x$ -coordinate 4.

The normal to the curve at  $P$  is parallel to the line  $2x + 3y = 0$  and meets the  $x$ -axis at the point  $Q$ .

The line  $PQ$  is the radius of a circle centre  $P$ .

Show that  $k = \frac{1}{2}$ .

Find the equation of the circle.

**[10]**