**5.** The curve $C$ has equation

$$y = \arccos\left(\frac{1}{2}x\right) \qquad -2 \leqslant x \leqslant 2$$

(a) Show that $C$ has no stationary points.

(3)

The normal to $C$, at the point where $x = 1$, crosses the $x$-axis at the point $A$ and crosses the $y$-axis at the point $B$.

Given that $O$ is the origin,

(b) show that the area of the triangle $OAB$ is $\dfrac{1}{54}\left(p\sqrt{3} + q\pi + r\sqrt{3}\,\pi^2\right)$ where $p$, $q$ and $r$ are integers to be determined.

(5)