Q_1: Locate the points given in polar coordinates by

$P(4, \frac{3}{4}\pi)$, $Q(-3, \frac{1}{2}\pi)$, $R(4, \frac{1}{6}\pi)$ among [some] graph.

Let $x = r\cos\theta$

$y = r\sin\theta$

$P(x,y) \to (-2.82, 2.82)$; $Q(x,y) \longrightarrow (0,-3)$

Q_2: Which, if any, of

A. $(4, 7\pi/3) \to (x,y)$: $2, 2\sqrt{3}$ ✓

B. $(4, \pi/3) \longrightarrow (x,y)$: $2, 2\sqrt{3}$ ✓

C. $(-4, 7\pi/6) \longrightarrow (x,y)$: $2\sqrt{3}, 2$

are polar coordinates for the point given in Cartesian coordinates by $P(2, 2\sqrt{3})$

A and B only!

Q_3: Find the Cartesian coordinates, (a,b), of the point given in polar coordinates by $P(2, \pi/3)$.

Let $x = r\cos\theta \to 2\cos(\frac{\pi}{3}) = 1$

$y = r\sin\theta \longrightarrow 2\sin(\frac{\pi}{3}) = \sqrt{3}$

$P(2, \pi/3): (r,\theta) \longrightarrow P(x,y): (1, \sqrt{3})$ ✓

Q_4: Find a polar equation for the curve given by the Cartesian equation:

$$3y^2 = x$$

$y = r\sin\theta$

$x = r\cos\theta$

$$\frac{3r^2\sin^2\theta}{\sin^2\theta} = \frac{r\cos\theta}{\sin^2\theta}$$

$$\frac{1}{\cancel{r}} \cdot 3r^{\cancel{2}} = \frac{\cancel{r}\cos\theta}{\sin^2\theta} \cdot \frac{1}{\cancel{r}}$$

$$3r = \frac{\cos\theta}{\sin\theta} \cdot \frac{1}{\sin\theta}$$

$$\boxed{3r = \cot\theta \csc\theta}$$ ✓

Q_5: Find a Cartesian equation for the curve given by the polar equation:

$$r + 6\cos\theta = 0.$$

$$x^2 + y^2 = -36\cos^2\theta$$

$x = r\cos\theta$

$y = r\sin\theta$

Q_6: Find a polar representation for the curve whose Cartesian equation is:

$$(x+1)^2 + y^2 = 1$$

$$x^2 + 2x + 1 + y^2 = 1$$

$-1 \qquad -1$

$$x^2 + 2x + y^2 = 0$$

	x	$+1$
x	x^2	x
$+1$	x	1

$y = r\sin\theta$

$x = r\cos\theta$

$$r^2\cos^2\theta + 2r\cos\theta + r^2\sin^2\theta = 0$$

$$r^2(\cos^2\theta + \sin^2\theta) + 2r\cos\theta = 0$$

$$r^2 + 2r\cos\theta = 0$$

$-r^2 \qquad -r^2$

$$\frac{2r\cos\theta}{r} = \frac{-r^2}{r}$$

$$2\cos\theta = -r$$

$+r$

$$r + 2\cos\theta = 0$$