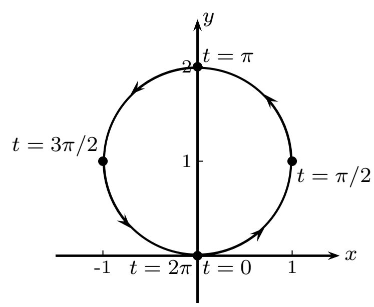
(a) *Sketch the curve by using the parametric equations to plot points. Indicate with an arrow the direction in which the curve is traced as t increases.*[1]

$$x = \sin(t), \quad y = 1 - \cos(t), \quad 0 \le t \le 2\pi$$

Let's make a table of values with $t$ as the independent variable, and $x$ and $y$ as functions of $t$.

| $t$ | $0$ | $\pi/2$ | $\pi$ | $3\pi/2$ | $2\pi$ |
|---|---|---|---|---|---|
| $x$ | $0$ | $1$ | $0$ | $-1$ | $0$ |
| $y$ | $0$ | $1$ | $2$ | $1$ | $0$ |

Here's the graph:




(b) *Eliminate the parameter to find a Cartesian equation of the curve.*

We have

$$x = \sin(t) \qquad\qquad y = 1 - \cos(t)$$

so

$$x^2 = \sin^2(t) \qquad\qquad (y-1)^2 = (-\cos(t))^2$$
$$x^2 = \sin^2(t) \qquad\qquad (y-1)^2 = \cos^2(t)$$

Adding the two equations gives us

$$x^2 + (y-1)^2 = \sin^2(t) + \cos^2(t)$$
$$x^2 + (y-1)^2 = 1$$

Thus the graph of $x = \sin(t)$, $y = 1 - \cos(t)$, $0 \le t \le 2\pi$, is a circle of radius 1, centered at (0,1).

[1]Stewart, *Calculus, Early Transcendentals*, p. 645, #8.