§10-1 Curves Defined by Parametric Equation

＊Parameter Equation：$x = f(t), y = g(t)$.

Parameter Curve：$\{(x, y) : x = f(t), y = g(t)\}$.

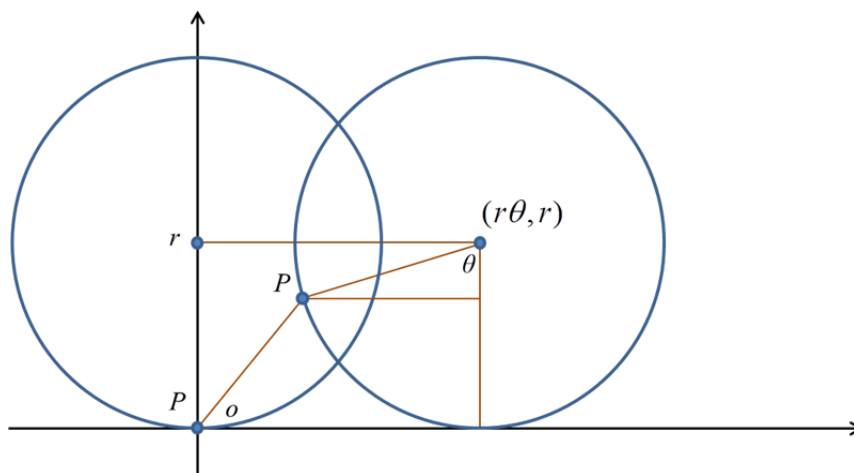**Example 1**： Verify the curve $x = \cos t, y = \sin t, 0 \le t \le 2\pi$.
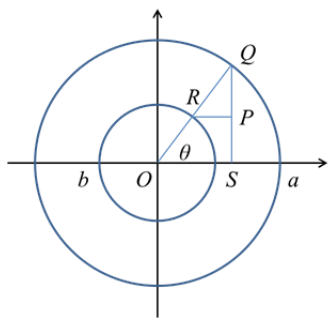
Solution：

The circle： $x^2 + y^2 = 1$

Example 2：The curve traced out by a point P on the circumference of a circle as the circle rolls along a straight line is called a cycloid. Find parametric equation for the cycloid.

Solution：

$p(x, y)$
$x = r\theta - r\sin\theta$
$y = r - r\cos\theta$.

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Example 3：Find *P(x,y)* in terms of Q. What is its parametric curve?

Solution：

$$x = \overline{SO} = a\cos\theta,\ y = \overline{QS} - \overline{SP} = a\sin\theta - b\sin\theta$$

$$\Rightarrow \cos\theta = \frac{x}{a}\ \text{and}\ \sin\theta = \frac{y}{(a-b)}$$

$$\Rightarrow \frac{x^2}{a^2} + \frac{y^2}{(a-b)^2} = 1.$$

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