

### Section 3.9 Slopes and tangents to parametric curves

Suppose that the curve  $C$  is given by parametric equations  $x = x(t)$ ,  $y = y(t)$ , then

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$$

**Example 1.** Find an equation of the tangent to the curve  $x(t) = t \sin t$ ,  $y(t) = t \cos t$  at the point corresponding to  $t = \pi$ .

**Example 2.** Find the points on the curve  $x = t(t^3 - 3)$ ,  $y = 3(t^3 - 3)$ , where the tangent is vertical or horizontal.

**Example 3.** At what points on the curve  $x = t^3 + 4t$ ,  $y = 6t^2$  is the tangent parallel to the line with the equations  $x = -7t$ ,  $y = 12t - 5$ ?