**Parametric Differentiation**

Recall from the previous chapter that parametric equations are when we define each of $x$ and $y$ (and possibly $z$) in terms of some separate parameter, e.g. $t$.

**If** $x$ **and** $y$ **are given as functions of a parameter** $t$**, then**

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

1. Find the gradient at the point $P$ where $t=2$, on the curve given parametrically by

$$x=t^{3}+t,       y=t^{2}+1,  t\in R$$

1. Find the equation of the normal at the point $P$ where $θ=\frac{π}{6}$, to the curve with parametric equations

 $x=3\sin(θ),  y=5\cos(θ)$

**Test Your Understanding**

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