

1(a)	$x^3 + 4x = 8v \frac{dv}{dx}$
	$\int (x^3 + 4x) dx = \int 8v dv$ $4v^2 = \frac{1}{4}x^4 + 2x^2 + c$
	$v^2 = \frac{1}{16}x^4 + \frac{1}{2}x^2 + 1 \quad \left[= \left(\frac{1}{4}x^2 + 1 \right)^2 \right]$ $v = \frac{1}{4}x^2 + 1$
1(b)	$\frac{dx}{dt} = \frac{1}{4}x^2 + 1 \text{ leading to } \int \frac{1}{\frac{1}{4}x^2 + 1} dx = \int dt .$ $t = 4 \int \frac{1}{x^2 + 4} dx = 2 \tan^{-1} \left(\frac{1}{2}x \right) [+C]$
	$C = 0 \text{ so } x = 2 \tan \left(\frac{1}{2}t \right)$