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 Petroleum
 16/ENG/07/021

$$\frac{dx}{dt} = \frac{dx}{d\theta} \frac{d\theta}{dt}$$

$$\frac{dx}{d\theta} = \frac{dx}{dt} \frac{dt}{d\theta}$$

$$\frac{dx}{d\theta} = \frac{dx}{dt} \frac{1}{\frac{d\theta}{dt}}$$

$$\frac{dx}{d\theta} = \frac{dx}{dt} \frac{1}{\frac{d}{dt}(\cos^{-1} \frac{y}{x})}$$

$$\frac{dx}{d\theta} = \frac{dx}{dt} \frac{1}{-\frac{1}{\sqrt{1-\frac{y^2}{x^2}}} \frac{d}{dt}(\frac{y}{x})}$$

$$\frac{dx}{d\theta} = \frac{dx}{dt} \frac{1}{-\frac{1}{\sqrt{1-\frac{y^2}{x^2}}} (\frac{y}{x^2} \frac{dx}{dt} - \frac{dy}{x} \frac{dx}{dt})}$$

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Expressions for the coordinates of the circle
 in terms of θ and r
 $x = r \cos \theta$
 $y = r \sin \theta$
 $r = \sqrt{x^2 + y^2}$

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