

How to differentiate $x = L\sin\left(\frac{\theta}{2}\right) + L/2 \sin\left(\frac{\theta}{2}\right)$

Solution:

$$x = L\sin\left(\frac{\theta}{2}\right) + L/2 \sin\left(\frac{\theta}{2}\right) = \frac{3}{2}L\sin\left(\frac{\theta}{2}\right)$$

$$\frac{dx}{d\theta} = \frac{3}{2} \cdot \frac{1}{2}L\cos\left(\frac{\theta}{2}\right) = \frac{3}{4}L\cos\left(\frac{\theta}{2}\right)$$

Answer: $\frac{dx}{d\theta} = \frac{3}{4}L\cos\left(\frac{\theta}{2}\right)$.