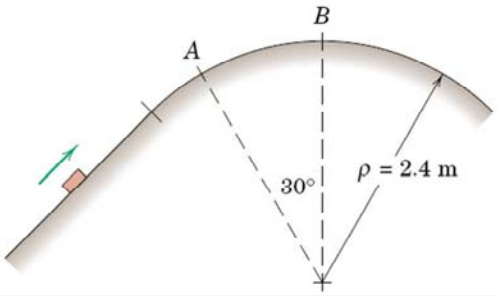
Curvilinear Motion: Exercise 1

A ***2-kg*** block passes over the ***top B*** with a ***speed*** of ***3.5 m/s***.

Calculate the ***normal force*** N_B exerted by the path on the block.



Determine the ***maximum speed v*** which the block can have at ***A*** without losing contact with the path.

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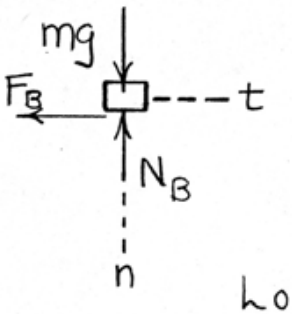
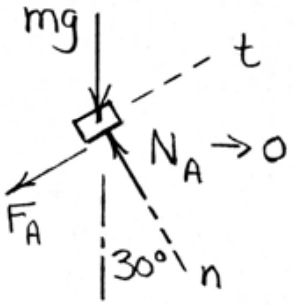


$\Sigma F_n = ma_n = m\frac{v^2}{\rho}$:

$2(9.81) - N = 2\frac{3.5^2}{2.4}$

$N_B = 9.41$ N

Loss of contact at A: $N_A \to 0$



$\Sigma F_n = ma_n = m\frac{v^2}{\rho}$:

$mg\cos 30° = m\frac{v^2}{2.4}$

$v = 4.52$ m/s