Steps in Newton's Method

Equation to be solved

$\mu * g * \cos(\theta) + \mu * r * \omega^2 = g * \sin(\theta)$

Step 1

Rearrange the equation by bringing all terms to one side

$\mu * g * \cos(\theta) + \mu * r * \omega^2 - g * \sin(\theta) = 0$

Step 2

Define the function f to be the expression that you get by bringing all terms to one side

$f(\theta) = \mu * g * \cos(\theta) + \mu * r * \omega^2 - g * \sin(\theta)$

Step 3

Define the function fp to be the derivative of the function f

$fp(\theta) = -\mu * g * \sin(\theta) - g * \cos(\theta)$

Newton's Method

Finds the value of θ where the function $f(\theta)$ is 0, i.e., solves the equation:

$f(\theta) = 0$

Newton's Method Equation

$$\theta_{new} = \theta_{old} - f(\theta_{old}) / fp(\theta_{old})$$

Step 4

Define an initial guess for θ and then iterate the above Newton's Method Equation until the desired accuracy is achieved for θ.