Central Forces Quiz 1

1. Use the change of variable $z = \cos\theta$ to rewrite the following Legendre's equation in terms of θ and derivates with respect to θ:

$$(1 - z^2)P''(z) - 2zP'(z) + l(l+1)P(z) = 0.$$

Hint: $P'(z) = \dfrac{dP(z)}{dz}$ and $P''(z) = \dfrac{d}{dz}\left(\dfrac{dP(z)}{dz}\right)$