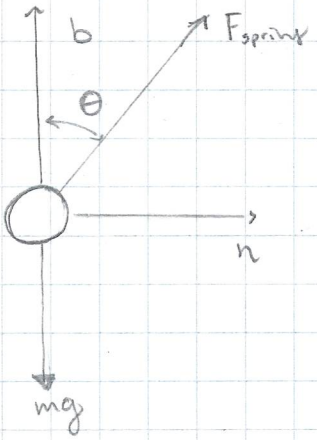
# 20-P-FA-AF-004

E&M: Normal/Tangential Components: Advanced

Q: What is the vertical acceleration and normal acceleration when the spring is streched 01 m? The spring constant is k and, angle $\theta$ to the vertical access and the ball of mass M kg.

What is the if ^ the stretching was 02 m?

A:




$F_{spring} = k \cdot d$

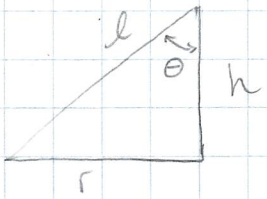
$\rightarrow \sum F_n = ma_n$; $F_{spring} \sin(\theta) = m a_n$

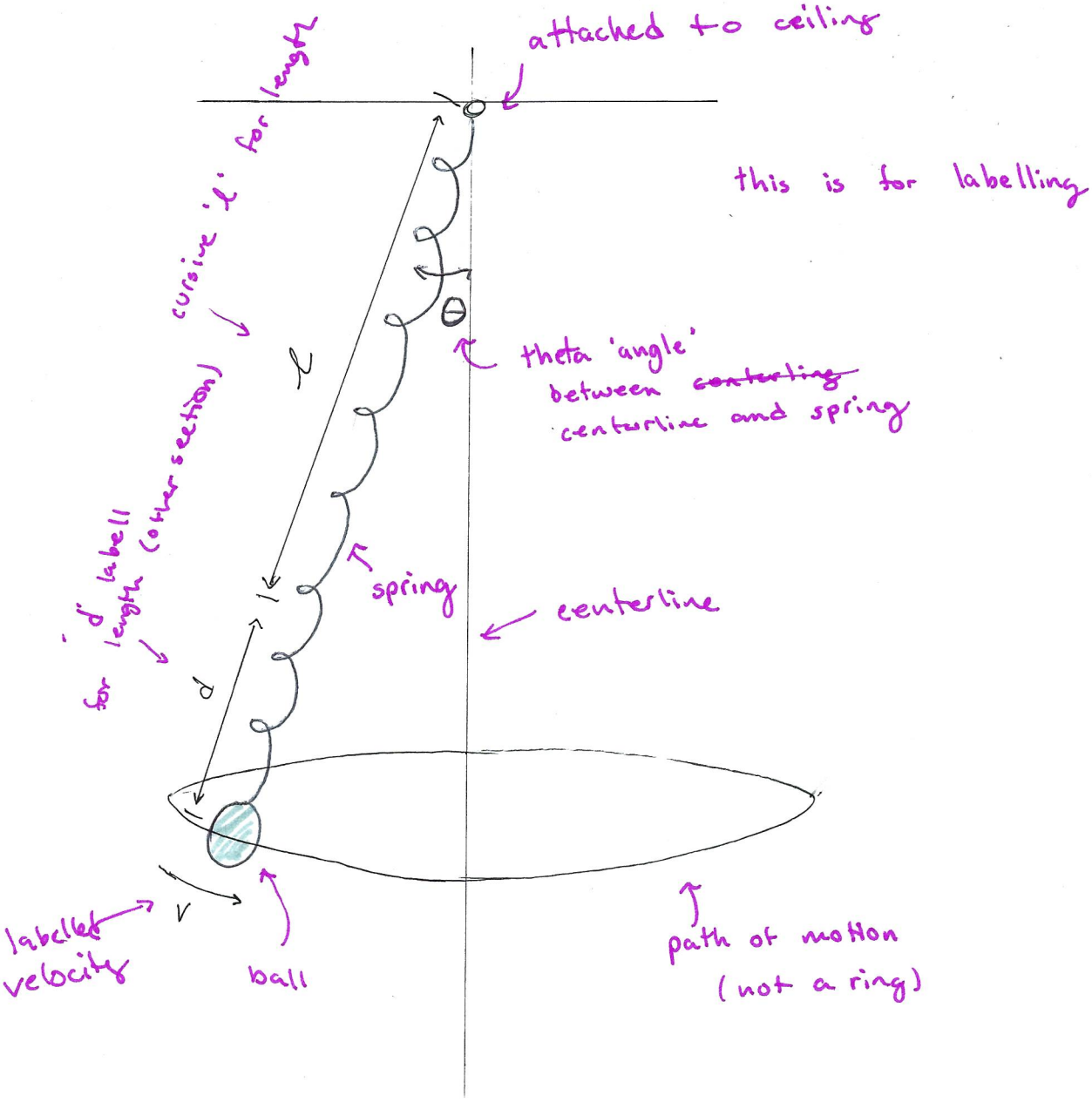
$k \cdot d \sin\theta = m \frac{v^2}{l \sin\theta}$

$$v = \sqrt{\frac{kd \sin\theta^2 \cdot l}{m}}$$

$+\uparrow \sum F_b = 0$; $F_{spring} \cos\theta - mg = m a_b$

$$a_b = \frac{kd\cos\theta - mg}{m}$$




attached to ceiling
this is for labelling
cursive 'l' for length
theta 'angle' between centerline and spring
'd' labell (other section) for length
spring
centerline
labelled velocity
ball
path of motion (not a ring)