Problem 1

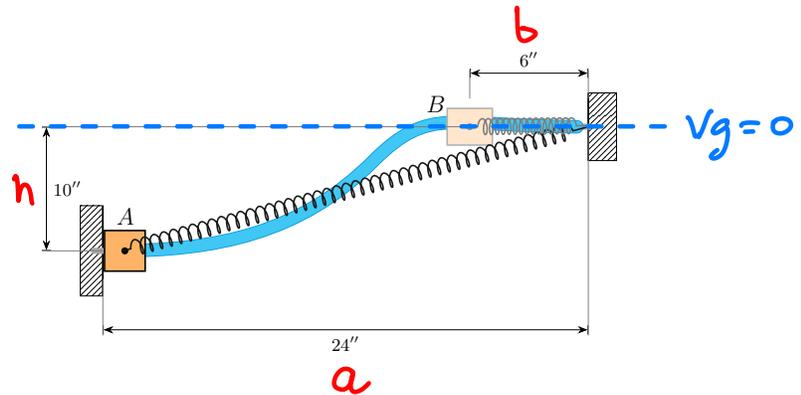### Problem 1.1

The slider of mass m moves freely along the fixed curved rod from A to B in the vertical plane under the action of the spring of constant k. If the slider is released from rest at A, calculate its velocity v as it reaches B.

The following equation is used to calculate changes in velocity after changes in position:

$$T_1 + V_1 + U_{1-2}^{(NC)} = T_2 + V_2$$

Complete the following questions

I. What is the name of two or three students on this team?

II. $T_1 =$ 0 released from rest

III. $V_1 =$ $-mgh + \frac{1}{2}K\left(\sqrt{h^2+a^2} - b\right)$ (based on choice of datum)

IV. $T_2 =$ $\frac{1}{2}m v_2^2$

V. $V_2 =$ 0 (based on my choice of datum)

VI. $U_{1-2}^{(NC)} =$ 0 (No NC Forces acting)

VII. $v_2 =$ $-mgh + \frac{1}{2}K\left(\sqrt{h^2+a^2} - b\right) = \frac{1}{2}m v_2^2$

$$v_2 = \sqrt{\frac{K}{m}\left(\sqrt{h^2+a^2} - b\right) - 2gh}$$