**Physics 101Rec**
**Quiz#6c**
**Chapter 8**

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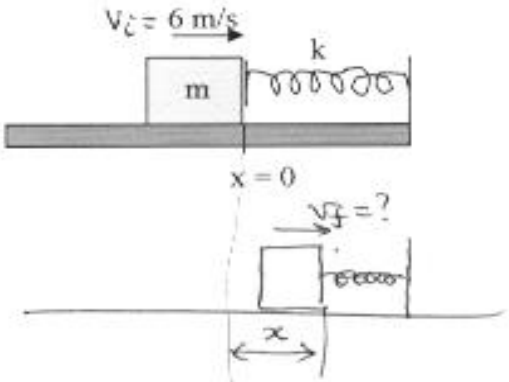
Name: Key Id: Sect:

A block of mass m = 2.0 kg slides on a rough horizontal surface towards a spring with a spring constant k = 800 N/m. The speed of the block just before it hits the spring is 6.0 m/s. How fast is the block moving when the spring is compressed by 20 cm? The coefficient of kinetic friction between the surface and the block is 0.4.




$$\Delta K + \Delta U_s = -f_k d$$

$$\frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2 + \left(\frac{1}{2}kx^2 - 0\right) = -\mu_k mgx$$

$$v_f^2 = v_i^2 - \frac{k}{m}x^2 - 2\mu_k gx$$

$$v_f = \sqrt{v_i^2 - \frac{k}{m}x^2 - 2\mu_k gx}$$

$$v_f = \sqrt{36 - 16 - 1.176} = \boxed{4.3 \text{ m/s}}$$