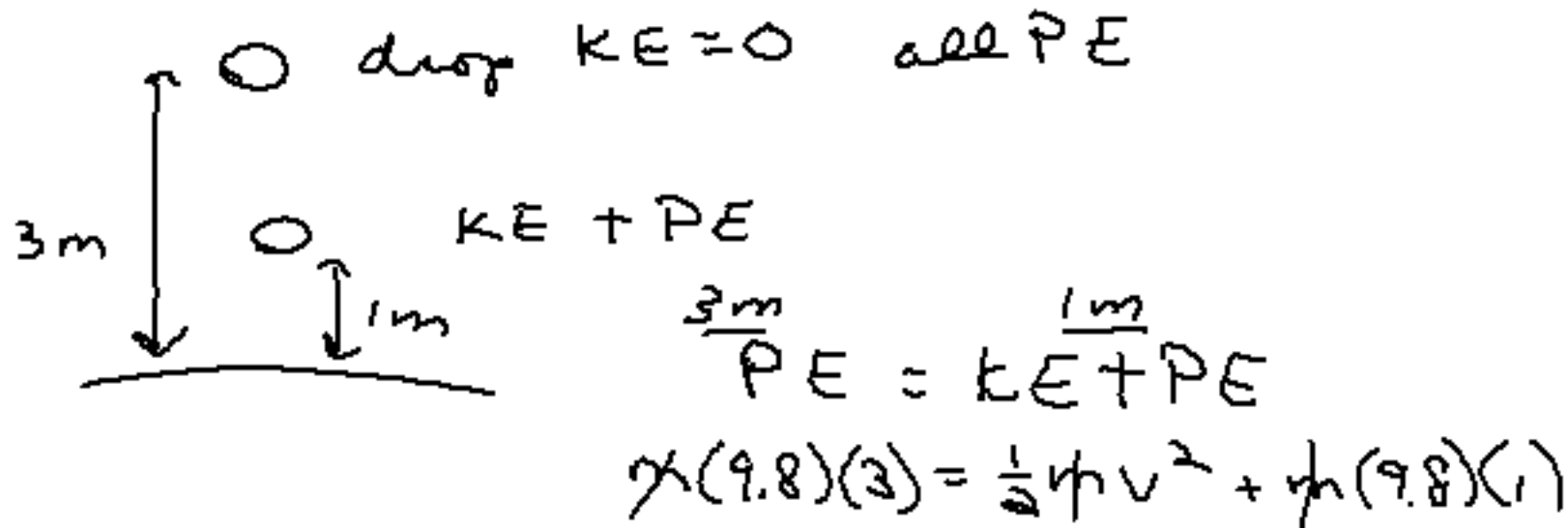


Law of conservation of Energy
p 156 & p 149

p 150 ex 6-8



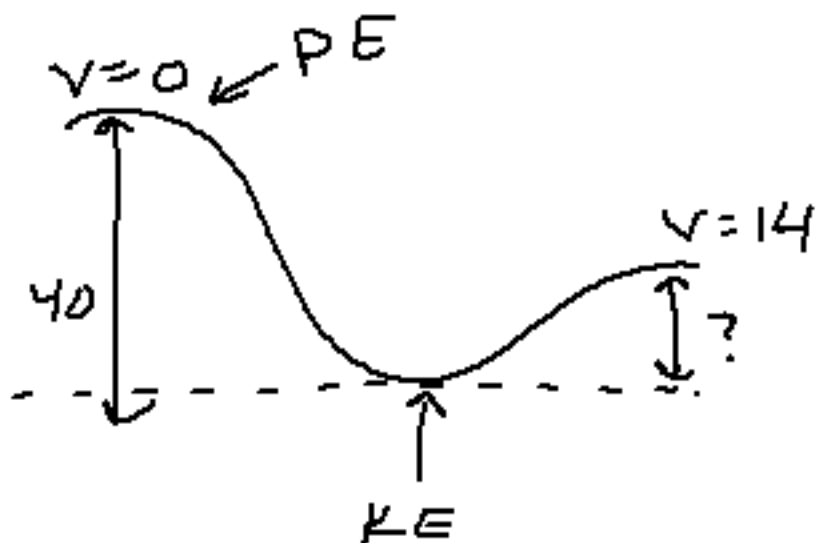
$$v = 6.26 \text{ m/s}$$

how fast does it hit ground?

$$PE = KE$$

$$\frac{1}{2}(9.8)(3) = \frac{1}{2}v^2 \quad v = 7.67 \text{ m/s}$$

p 151 ex 6-9



$$PE = KE$$

$$m(9.8)(40) = \frac{1}{2}mv^2$$

$$v = 28.0 \text{ m/s}$$

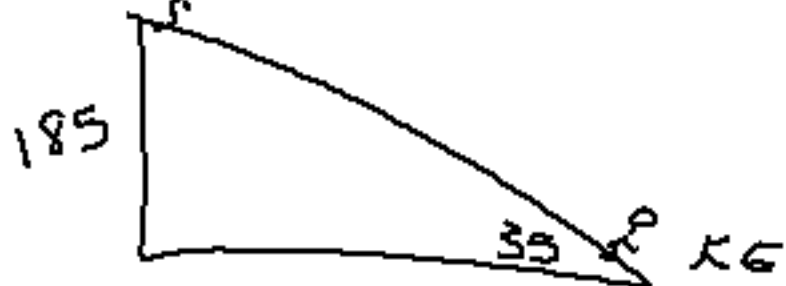
$$PE = PE + KE$$

$$m(9.8)40 = m(9.8)h + \frac{1}{2}m(14)^2$$

$$h = 30.0 \text{ m}$$

p 163 #34

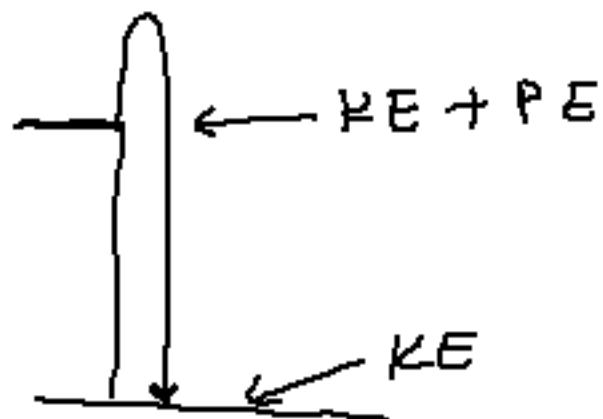
$v=0$ PE



$$m(9.8)185 = \frac{1}{2}mv^2$$

$$v = 60.2 \text{ m/s}$$

A rock is thrown up with a speed of 5.00 m/s from the top of a 20.0 m cliff. How fast is it going when it reaches the bottom?



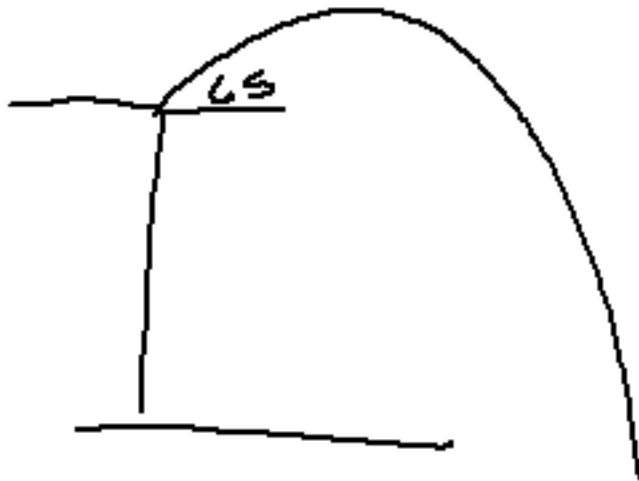
$$\frac{1}{2} m (5)^2 + m (9.8) 20 = \frac{1}{2} m v^2$$
$$v = 20.4$$

What if thrown down at 5.00 m/s?

same

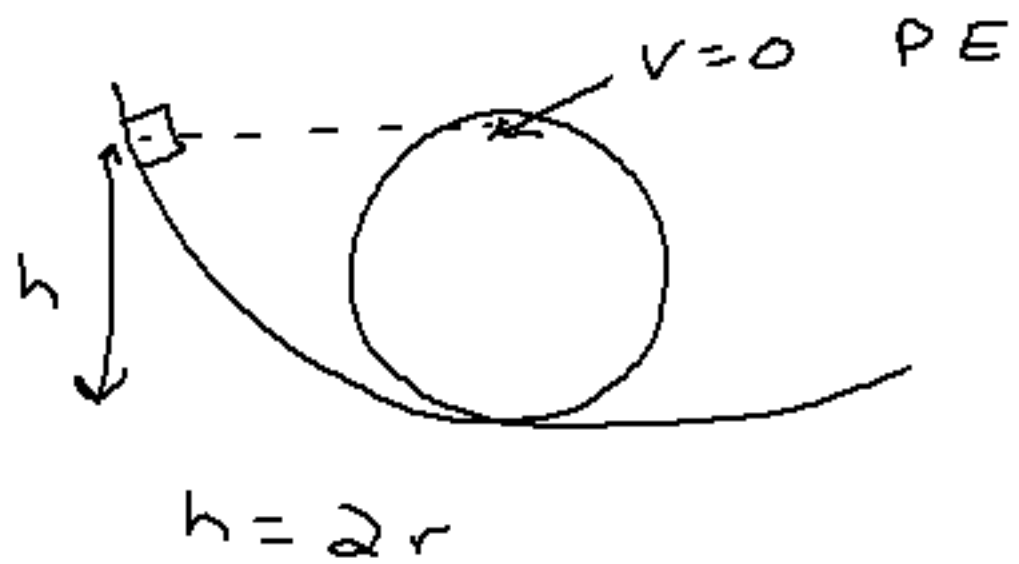
cont'

What if thrown up at an angle of 65.0 degrees at 5.00 m/s from the top of the 20.0 m cliff?



same

p 163 # 40



A high jumper running at 5.80 m/s crosses the bar going 1.00 m/s. How high is the bar?



$$\frac{1}{2} m (5.8)^2 = \frac{1}{2} m (1^2) + m (9.8) h$$

$$h = 1.67 \text{ m}$$

p 153 ex 6-11

$$\frac{1}{2} k x^2 = \frac{1}{2} m v^2$$

$$\frac{1}{2} (250) (.06)^2 = \frac{1}{2} (.1) v^2$$

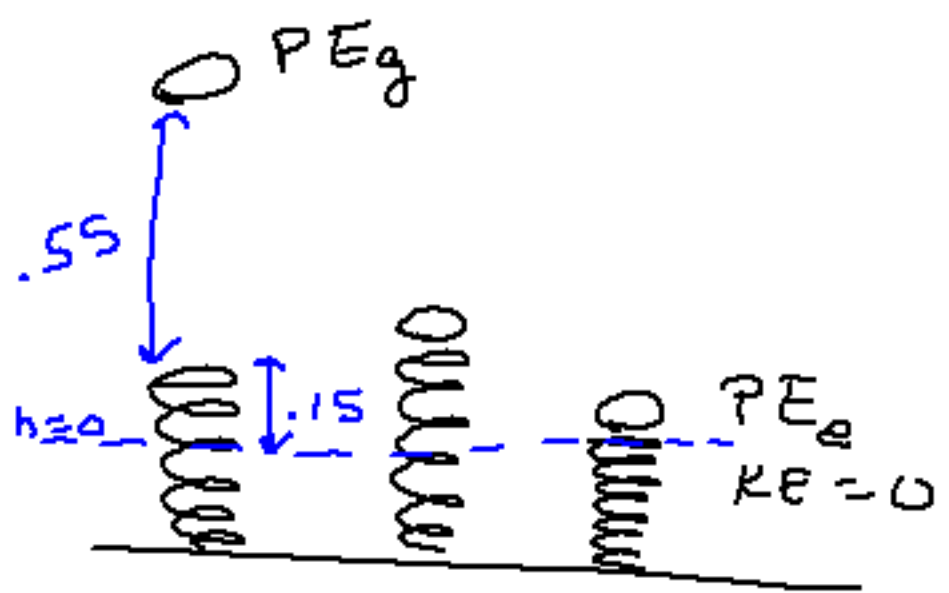
$$v = 3.00 \text{ m/s}$$

A 1.10 kg ball hits a horizontal spring that has a spring constant of 395 N/m. If the ball was going 10.0 m/s, how far will the spring compress? Assume no friction.

$$\frac{1}{2} (395) x^2 = \frac{1}{2} (1.1) 10^2$$

$$x = .528 \text{ m}$$

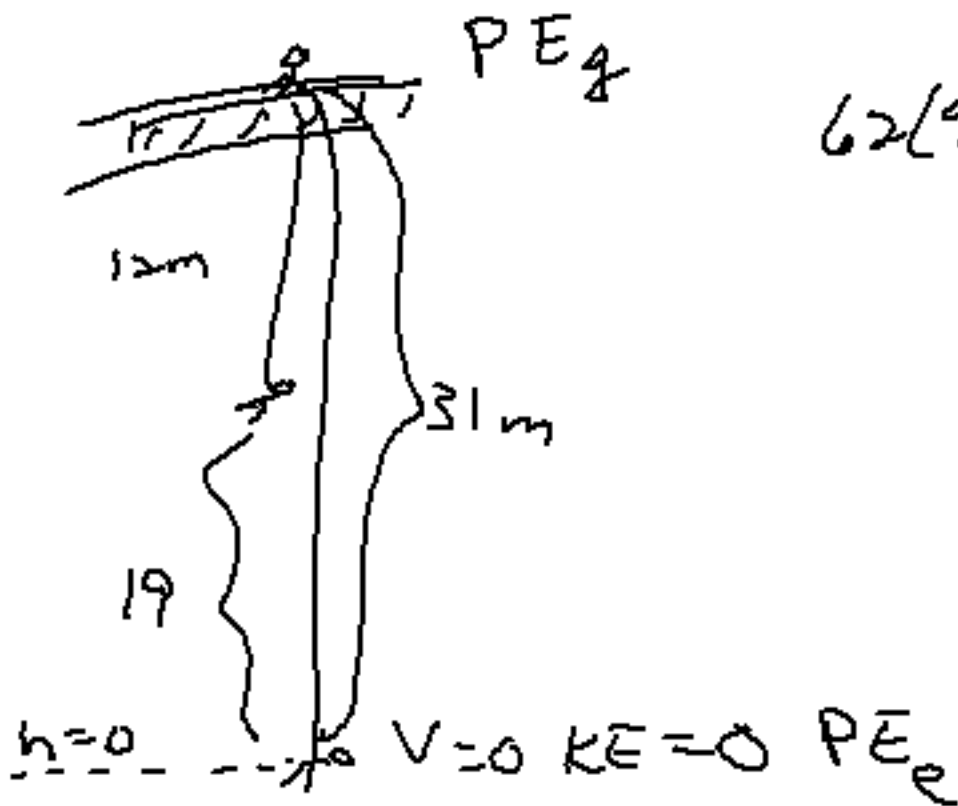
p 154 ex 6-12



$$PE_g = PE_e$$
$$mgh = \frac{1}{2} k x^2$$
$$2.6(9.8)(.70) = \frac{1}{2} k (.15)^2$$
$$k = 1585 \text{ N/m}$$

$$2.6(9.8)(.55) = \frac{1}{2} k (.15)^2 + 2.6(9.8)(-.15)$$

p 163 #42



$$PE_g = PE_e$$

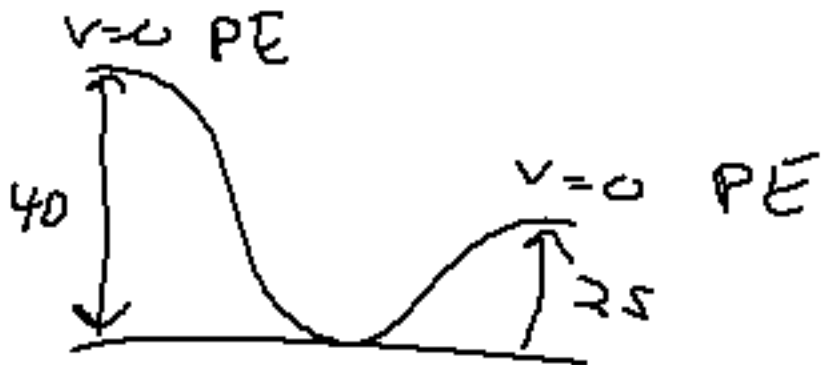
$$62(9.8)(31) = \frac{1}{2} K (19)^2$$

$$K = 104 \text{ N/m}$$

p 156 - read

p 157 ex 6-13

find amount of thermal energy first



$$PE = 1000(9.8)40$$
$$= 392,000 \text{ J}$$

$$PE = 1000(9.8)25$$
$$= 245,000 \text{ J}$$

$$W = \text{Th. E} = 392,000 - 245,000 = 147,000 \text{ J}$$

$$Fd = 147,000 \text{ J}$$

$$F(400) = 147,000$$

$$F = 368 \text{ N}$$