

Each problem is worth zero points, but there is a chance you'll learn some math.

1. A force of 8 pounds is required to hold a spring stretched 6 inches beyond its natural length. How much work is done in stretching it from 6 inches to 12 inches beyond its natural length?

$$k = 16, \text{ Work} = 6 \text{ foot-pounds}$$

2. A spring has a natural length of 10cm. If 5N of force are required to hold it stretched to a length of 12cm, how much work is required to stretch it from natural length to 15cm?

$$k = 250, \text{ Work} = 0.3125 \text{ Joules}$$

3. Suppose that 6J of work are required to hold a spring stretched to a length of 60cm rather than its natural length of 50cm. How much work is required to stretch it from 50cm to 80cm?

$$k = 1200, \text{ Work} = 54 \text{ Joules}$$

4. If 10 foot-pounds of work stretches a spring from its natural length of 8 inches to a length of 12 inches, how much force is required to hold it stretched to that 12 inch length?

$$k = 180, \text{ Force} = 60 \text{ pounds}$$

5. If 3N of force holds a spring stretched to a length of 20cm and 5N of force holds it stretched to a length of 25cm, how much work is required to stretch it from 20cm to 25cm?

$$l = 12.5\text{cm}, k = 2/5, \text{ Work} = 0.002 \text{ Joules}$$

6. If a spring requires 30 foot-pounds of work to stretch from a natural length of 24 inches to 30 inches, how far will 15 foot-pounds of work stretch it?

$$k = 240, \text{ distance} \approx 0.35 \text{ feet beyond natural length} \approx 28 \text{ inches}$$

7. Generalize problem 6: If n foot-pounds of work stretch a spring from natural length to f feet beyond natural length, how far will $n/2$ foot-pounds of work stretch it?

$$k = \frac{2n}{f^2}, \quad b = \frac{f}{\sqrt{2}}$$