

1. A force of 10 lb is required to hold a spring stretched 4 in. beyond its natural length. How much work is done in stretching it from its natural length to 6 in. beyond its natural length?
2. A spring has a natural length of 20 cm. If a 25-N force is required to keep it stretched to a length of 30 cm, how much work is required to stretch it from 20 cm to 25 cm?
3. Suppose that 2 J of work are needed to stretch a spring from its natural length of 30 cm to a length of 42 cm. How much work is needed to stretch it from 35 cm to 40 cm?
4. If the work required to stretch a spring 1 ft beyond its natural length is 12 ft-lb, how much work is needed to stretch it 9 in. beyond its natural length?
5. How far beyond its natural length will a force of 30 N keep the spring in Exercise 7 stretched?
6. If 6 J of work are needed to stretch a spring from 10 cm to 12 cm and another 10 J are needed to stretch it from 12 cm to 14 cm, what is the natural length of the spring?

Answers to Stewart 4th § 6.4: 5-10

5. $\frac{15}{4}$ ft. lb

6. $0.3125 \text{ J} \approx 0.31 \text{ J}$

7. $\frac{25}{24} \text{ J} \approx 1.04 \text{ J}$

8. 6.75 ft. lb.

9. 10.8 cm

10. 8 cm