

1. How much work is done lifting a 150 kg rock to a height of 7 m?
2. A spring has a natural length of 25 cm. If a 50-N force is required to keep the spring compressed 5 cm, how much work is done during this compression? How much work is required to compress the spring to a length of 15 cm?
3. A spring has natural length 100 cm. Compare the work W_1 done in stretching the spring from 100 cm to 120 cm with the work W_2 done in stretching it from 120 cm to 140 cm. How are W_2 and W_1 related?
4. If 4 J of work is needed to stretch a spring from 15 cm to 20 cm and another 7 J is needed to stretch it from 20 cm to 25 cm, what is the natural length of the spring?
5. A 20 meter rope with a mass of 10kg hangs from the top of a 320 meter tall building. Find the work required to pull the rope to the top of the building.
6. A chain lying on the ground is 30 feet long and it weighs 15 lbs. How much work is required to raise one end of the chain to a height of 10 feet?
7. A 10 foot chain weighing 50 lbs is hanging off the edge of a building. Find the work required to pull the chain up so only 6 feet of chain are hanging over the edge.
8. A circular swimming pool has a diameter of 16 ft, the sides are 7 ft high, and the depth of the water is 5 ft. How much work is required to pump all of the water out over the side? (Use the fact that water weighs 62.5 lb/ft³.)
9. A tank is full of water. The tank is in the shape of a frustum of a cone, with upper radius of 8 ft, lower radius 4, and height 7 ft. Find the work required to pump the water out of spout that extends 1 foot above the top.
10. A bucket that weighs 6 lb and a chain weighing 2 lb/ft are used to draw water from a well that is 100 ft deep. The bucket is filled with 50 lb of water and is pulled up at a rate of 4 ft/s, but water leaks out of a hole in the bucket at a rate of 0.1 lb/s. Find the work done in pulling the bucket to the top of the well.