

Work 1 (ANSWER KEY)

Solve the following problems.

1. (Serway, p 162 #1) A tugboat pulls a ship with a constant net horizontal force of 5.00×10^3 N and causes the ship to move through the harbor. How much work is done on the ship if it moves a distance of 3.00 km?

$$w = 1.5 \times 10^7 \text{ J}$$

2. (Serway, p 162 #2) A weight lifter lifts a set of weights a vertical distance of 2.00 m. If a constant net force of 350 N is exerted on the weights, what is the net work done on the weights?

$$w = 700 \text{ J}$$

3. (Serway, p 162 #3) A shopper in a supermarket pushes a cart with a force of 35 N directed at an angle of 25° downward from the horizontal. Find the work done by the shopper on the cart as the shopper moves along a 50.0 m length of aisle?

$$w = 1586 \text{ J}$$

4. (Serway, p 162 #4) If 2.0 J of work is done to raise a 180 g apple at a constant rate, how far is the apple lifted?

$$d = 1.13 \text{ m}$$

5. A person pushes a box with a force of 300 N. If the force is exerted downward at some angle, what must the angle be if the displacement is 15 m and the work done is 3200 J.

$$45^\circ$$

6. (Walker, p 193 #1) A farmhand pushes a 23 kg bale of hay 3.0 m across the floor of a barn. If she exerts a horizontal force of 80.0 N on the hay, how much work has she done?

7. $w = 240 \text{ J}$

8. (Walker, p 193 #2) Children in a tree house lift a small dog in a basket 4.70 m up to their house at a constant rate. If it takes 201 J of work to do this, what is the combined mass of the dog and basket?

$$m = 4.4 \text{ kg}$$

Name: _____

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Dr. Croom's Physics

Chapter 5A: Work and Energy

9. (Walker, p 193 #3) Early one October, you go to a pumpkin patch to select your Halloween pumpkin. You lift the 3.2 kg pumpkin to a height of 1.2 m, and then carry it 50.0 m (on level ground at a constant rate) to the check-out stand. **(a)** Calculate the work you do on the pumpkin as you lift it from the ground. **(b)** How much work do you do on the pumpkin as you carry it from the field?

a) $w = 37.63 \text{ J}$ b) 0 J

10. (Giancoli, p 174 #1) A 75 kg firefighter climbs a flight of stairs 10.0 m high. How much work is required?

a) $w = 7350 \text{ J}$

11. (Giancoli, p 174 #2) A 900 N crate rests on the floor. How much work is required to move it at a constant speed 6.0 m along the floor against a friction force of 180 N? How about to lift the crate vertically 6.0 m?

b) 1080 J , b) 5400 J