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Work 2

Solve the following problems.

1. (Walker, p 193 #4) The coefficient of kinetic friction between a suitcase and the floor is 0.26. If the suitcase has a mass of 70.0 kg, how far can it be pushed across the level floor with 640 J of work?

2. (Walker, p 193 #5) You pick up a 3.6-kg can of paint from the ground and lift it to a height of 2.1 m. (a) How much work do you do on the can of paint? (b) You hold the can stationary for half a minute, waiting for a friend on a ladder to take it. How much work do you do during this time? (c) Your friend decides against the paint, so you lower it back to the ground. How much work do you do on the can as you lower it?

3. (Walker, p 193 #6) A tow rope, parallel to the water, pulls a water skier directly behind the boat with constant velocity for a distance of 65 m before the skier falls. The tension in the rope is 120 N. (a) Is the work done on the skier by the rope positive, negative, or zero? Explain. (b) Calculate the work done by the rope on the skier.

4. (Walker, p 193 #6) A child pulls a friend in a little red wagon with constant speed. If the child pulls with a force of 16 N for 10.0 m, and the handle of the wagon is inclined at an angle of 25° above the horizontal, how much work does the child do on the wagon?

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5. (Walker, p 194 #9) A 55-kg packing crate is pulled with constant speed across a rough floor with a rope that is at an angle of 40.0° above the horizontal. If the tension in the rope is 125 N, how much work is done on the crate to move it 5.0 m?

6. (Walker, p 194 #10) To clean a floor, a janitor pushes on a mop handle with a force of 50.0 N. (a) If the mop handle is at an angle of 55° above the horizontal, how much work is required to push the mop 0.50 m? (b) If the angle the mop handle makes with the horizontal is increased to 65°, does the work done by the janitor increase, decrease, or stay the same? Explain.

7. (Walker, p 194 #11) A small plane tows a glider at constant speed and altitude. If the plane does 2.00×10^5 J of work to tow the glider 145 m and the tension in the tow rope is 2560 N, what is the angle between the tow rope and the horizontal?

8. (Walker, p 194 #12) Water skiers often ride to one side of the center line of a boat. In this case, the ski boat is traveling at 15 m/s and the tension in the rope is 75 N. If the boat does 3500 J of work on the skier in 50.0 m, what is the angle ? between the tow rope and the center line of the boat?

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9. An 80kg person and a 400kg elevator are lifted by a cable 15m while accelerating at 1.5m/s². What is the work the lift must do to lift at this rate? What is the minimum work the lift must due to lift the elevator and the person?

10. (Giancoli, p 174 #4) A car does 7.0 x 10⁴ J of work in traveling 2.8 km at a constant speed. What was the average retarding force (from all sources) acting on the car?

11. (Giancoli, p 174 #5) How high will a 0.325 kg rock go if thrown straight up by someone who does 115J of work on it? Neglect Air resistance.

12. (Giancoli, p 174 #7) What is the minimum work needed to push a 1000kg car 200m up a 17.5° incline ignoring friction? If friction is present, what is the force required if the coefficient of friction is 0.25.

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13. (Giancoli, p 174 #8) A grocery cart with mass of 18 kg is pushed at a constant speed along an aisle by a force of 12N. The work done in each 15m long aisled 75J. Assuming the force is applied at an angle, find the angle?

14. (Giancoli, p 174 #10) A 280 kg piano slides 4.3 m down a 30° incline and is kept from accelerating by a man who is pushing back on it parallel to the incline. The effect coefficient of kinetic friction is 0.4. Calculate the force exerted by the man? The work done by the man on the piano, the work done by the friction force, the work done by the force of gravity, and the net work don on the painter.