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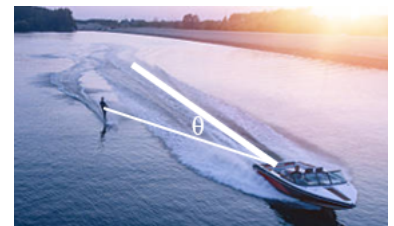
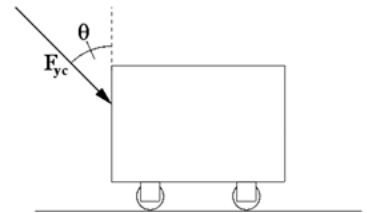
Assigned on Monday, November 11, 2024

14.1 Work Practice**Due Tuesday, November 12, 2024****Reminders:**

The amount of work done by a steady force is the amount of force multiplied by the distance an object moves parallel to that force: $W = Fd\cos\theta$. The units are Nm, which equal a Joule (J). Positive work is done by a force in the direction of an object's displacement. Negative work is done by a force opposite of an object's displacement. Work is a scalar quantity so it can be positive or negative but does not have direction.

Use 10 m/s² for g for the following problems

1. A friend's car is stuck on the ice. You push down on the car to provide more friction for the tires (by way of increasing the normal force), allowing the car's tires to propel it forward 5 meters onto the less slippery ground. How much work do you do?
2. You push a crate up a ramp with a force of 10 N. Despite your pushing, the crate slides down the ramp 4 m. How much work did you do?
3. How much work is done in lifting an 8-kg box from the floor to a height of 2m above the floor?
4. A 15-kg crate is moved along a horizontal floor by a warehouse worker who is pulling on it with a rope that makes a 30° angle with the horizontal. The tension in the rope is 69 N, and the crate slides a distance of 10 m. How much work is done on the crate by the worker?
5. In The previous question, assume the coefficient of kinetic friction between the crate and the floor is 0.4. (a). How much work is done by the normal force? (b). How much work is done by the friction force?
6. A box slides down an inclined plane 37° above the horizontal. The mass of the block, m , is 35 kg, the coefficient of kinetic friction is 0.3 and the length of the ramp, d , is 8 m. (a) How much work is done by gravity? (b) How much work is done by the normal force? (c) How much work is done by friction? (d) What is the total work done?
7. A person pushes a cart to the right with a force (F_{yc}) of 8 N at an angle of $\theta=40^\circ$ as shown in the diagram. The cart moves a horizontal distance of 10.0 m. a) what is the work done by the person on the cart? b) What is the work done by force normal? c) What is the work done by the force of gravity? d) If the cart is moving at a constant velocity, determine the work done by the force of friction. e) Lastly, calculate the net work on the cart.
8. Water skiers often ride to one side of the center line of a boat as shown to the right. 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 θ between the tow rope and the center line of the boat?



Answers

1. 0 J
2. -40 J
3. 160 J
4. 600 J
5. a) 0 J; b) -462 J
6. a) 1690 J; b) 0 J; c) -671 J; d) 1019 J
7. a) 51.4 J; b) 0 J; c) 0 J; d) -51.4 J; e) 0 J
8. 21.0°