

directions: Answer the following questions. If the question is a practice problem show your work, label and round to the hundredths.

- How is the scientific definition of work different from the everyday definition?
- Describe a situation in which a force is applied but no work is done.
- Which unit is larger a watt or a kilowatt?
- How do you convert mass to weight?
- Why is weight measure in newtons?
- A force of 10 000 N is applied to a stationary wall. How much work is performed?
- A 950 N skydiver jumps from an altitude of 3000 m. What is the total work performed on the skydiver?
- A bulldozer performs 80 000 J of work pushing dirt a distance of 16 m. What is the force of the dirt?
- An ant does 1 J of work in dragging a 0.0020 N grain of sugar. How far does the ant drag the sugar?
- You are walking from the parking lot your science class. You are carrying your 2 kg books. You walk through the 50 m parking lot, climb 2 m up the stairs, and walk down the hall an additional 100 m to your science classroom. What is the total work performed on your books?



- A horse performs 15 000 J of work pulling a wagon for 20 seconds. What is the horse's power?

- A 750 N pole-vaulter lifts himself 5 m high in 2.5 seconds. What is his power?

- A pump drains a small pond by performing 120 kJ of work. The power rating of the pump is 1 kW. How long does it take to drain the pond?



- A tow truck pulls a car out of a ditch in 6.5 seconds. If 6 kW of power is used, how much work is performed by the truck?

- An elevator lifts 5 passengers 30 m in 24 seconds. The power is 15 kW. What is the total weight of the elevator and passengers?

16. How much work is done by a crane that lowers 1000 N of material a distance of 150 meters?



17. How much work is done when a 1 kg mass is raised a vertical distance of 1 m?

22. A woman lifts a 35 kg child a distance of 1.5 m and carries her forward for 6.5 m.

a. How much work does the woman do in lifting the child?

b. How much work does the woman do carrying the child?

18. A 5 kg rock is lifted 2 m in 5 seconds. How much work is done? What power is used?

23. A box is pushed across the floor for a distance of 5 m with a force of 50 N in 5 seconds.

a. How much work is done?

b. What is the power?

19. Mrs. Heier pushed her 10 kg cart across the front of her classroom a distance of 5 m. She exerted a force of 20 N. How much work did she do?



c. If the box is pushed back again, what is the total amount of work done?

20. A weightlifter lifts a 150 kg barbell above his head from the floor to a height of 2 m. He holds the barbell there for 5 seconds. How much work does he do during that 5 second interval?

24. Mrs. Jensen and Mr. Von Fischer do the exact same amount of work. Mrs. Jensen does the work in 2.3 hours and Mr. Von Fischer does it in 2.5 hours. Who is more powerful? Explain.

21. A student who weighs 500 N climbed the stairs from the first floor to the third floor, 10 m above, in 20 seconds.

a. How much work did she do?

25. A rock climber wears a 7.5 kg backpack while scaling a cliff. After 30 minutes the 60 kg climber is 11 m above her starting point.

a. How much work did the climber do on the backpack?

b. What was her power?

b. How much total work did the climber do?



c. What was the power output of the climber?