Practice Problems
For Chapter 19

The problems and solutions that follow were designed by students. Although I have checked them, there are very possibly a few errors here and there. If you notice a mistake and turn in a typed correction, you will receive two extra homework points. You may also write new homework problems to add to any chapter and receive between 2 and 5 homework points per problem (see syllabus for details.) Please note: since these problems were written by students, the teacher takes no responsibility for errors – in other words, if there is a mistake and you make the same mistake on a test, you will not get credit for that mistake.

In the problems below, I have highlighted what I feel are the best problems to study prior to tests. The other problems are all ok, but they tend to be very easy problems or repeats of homework problems with slight variations. You may want to start with a few of the regular problems as warm up and then move on to the highlighted problems.

Chapter 19 – Problems

1.) A man is sledding down a track at 10 m/s until he hits a bit of mud which slows him down to 7.9 m/s. If the man and the sled had a combined weight of 783 Newtons and the patch of mud was only half a meter wide, what was the average force of the mud strip on the car? In which direction?

John Wheeler (class of 2008)

2.) Fred pulls an antique piano with wheels using a force of 700 N for 150 meters. If friction also acts on the piano with a force of 650 N, what is the total work done on the piano?

John Wheeler (class of 2008)

3.) Regina is roller skating when, all of a sudden, two other skaters lasso her and attempt to have a quasi-tug-o-war. Both skaters can pull with a force equal to their own weight and they pull until Regina has moved ten meters. If friction acts with a force of 120N and Lynda (58kg) is on her left and Turbo (84kg) is on her right, how much work was done on Regina?

John Wheeler (class of 2008)

4.) Lafanda is ice skating when she bumps into Mike Tyson. Unfortunately for Lafanda, Mike Tyson was cognizant of Lafanda's poor ice skating abilities and was therefore ready. After Lafanda runs into Mike with a force of 400 N, Mike channels all his strength and lunges forward with 1600 N of force. Luckily for Lafanda, Mike has mercy and stopps pushing her after 50 meters. What was Lafanda's velocity after 50 meters? (she has a mass of 60 kg)

John Wheeler (class of 2008)

5.) John is walking his dog on a leash with angle 30. The pooch is not in a good mood and is therefore pulling with 180N in the opposite direction from which John is going. John is pulling on the angled leash with a force of 400 N. After a 2km walk, what will the total work be on the dog? After 5 km?

John Wheeler (class of 2008)

Answers – Chapter 19

1.) W = change in T
(F)(d) = ½ mvf² - ½mvi²
(.5)F = .5(783/9.8)(8^2) – (.5)(783/9.8)(10^2)
F = 5113.47 – 7989.80
F = - 2876.33 N
It will be acting on the sled in the opposite direction of the sleds movement since it is slowing it down.

2.)
W = Fd
W = d(Force(Fred) – Force(Friction))
W = (150)(700 – 650)
W = 7500 J

3.)
W = Fd
W = d(Force(Turbo) – Force(Friction) – Force(Lynda))
W = 10((84)(9.8) – 120 – (58)(9.8))
W = 134.8 J

4.)
W = Fd
W = (50)(1600 – 400) = 60000 J
F = 1600 – 400 = 1200N
F = ma
1200 = (60)(a)
20 = a
$v_f^2 = v_i^2 + 2a\square x$
$v_f^2 = 2(20)\square 50\square$
v_f = 44.72 m/s (if she hits a wall … ouch!)

5.)
W = Fd
W = (400cos30 + 180cos180)(2km)
W = (166.41)(2000m)
a. W = 332,820.32 J
W = Fd
W = (400cos30 + 180cos180)(5km)
W = (166.41)(5000m)
b. W = 832,050.81 J