Ch. 6 Problem Worksheet

$MA = F_r / F_e$ $MA = d_e / d_r$ $MA = r_w / r_a$ $MA = L / h$ $PE = mgh$
$KE = ½\ mv^2$ $W = Fd$ $F_e d_e = F_r d_r$ $eff = (W_{out} / W_{in}) \times 100$

1. A worker applies an effort force of 10 N to pry open a window that has a resistance of 500 N. What is the MA of the lever? **50**

2. Find the effort force needed to lift a 2000 N rock, using a jack with a MA of 10. **200N**

3. A 5 meter long 1st class lever has the fulcrum 2 m from the end with a 500 N load. What is the MA of the lever? What effort force is needed to lift the load? Hint: draw a diagram of the lever first.
1.5; 333N

4. A boat winch has a handle with a radius of 40 cm and an axle with a radius of .5 cm. What is the MA of the winch? **80**

5. An inclined plane has a MA of 9. The inclined plane is 900 cm long. How high is the inclined plane?
100cm

6. A bricklayer lifts a 100 N block a distance of 1.5 m in a time of 2.3 s. How much work does the bricklayer do? What is the power output of the worker? **150J; 65W**

7. The bricklayer in problem 6 decides to move the block up a ramp that is 6 m long and 1.5 m high. He uses a force of 30 N to move the block up the ramp. How much work does he do moving the block up the ramp? What is the efficiency of the ramp (use the calculated work from problem #6 as the output work of the ramp and the work from #7 as the input work)? **180J; 83%**

8. A 1.5 kg book is lifted to a shelf that is 1.5 m high. What is the increase in the PE of the book? When the book falls off the shelf, what is the KE of the book as it hits the floor? **22.5J, 22.5J**

9. A 0.3 kg ball moving at 30 m/s has how much KE? When the catcher catches the ball, how much work does the ball do moving the catcher? **135J; 135J**

10. Diagram the three classes of levers. Label the fulcrum, resistance force, effort force. Give a common everyday example of each type of lever.