

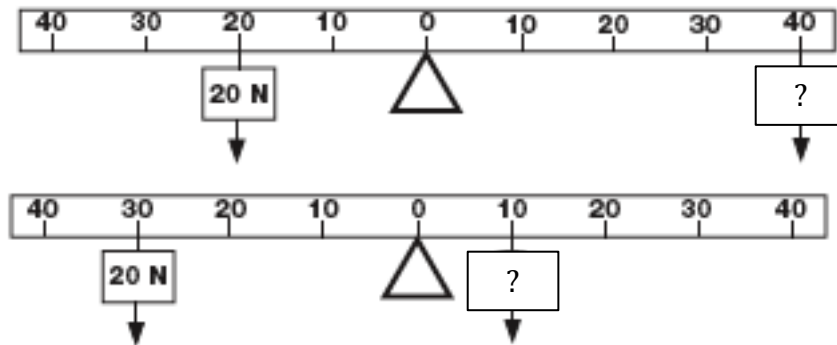
Unit 2 Review Problems:

Here are a bunch of questions to help with your studying. Make sure to go over all homework and quizzes as well. Remember, you will be given all equations on the test.

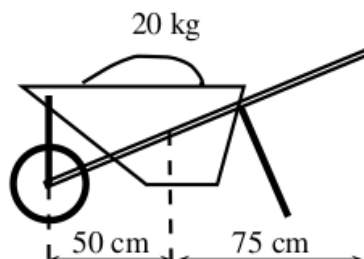
1. Define work and machine
2. How much work do you do if:
 - a. If you apply 540 N to move an object 100m
 - b. if you lift a 100 kg object 10m up a ladder?
 - c. Convert a and b to calories
3. Name the members of the
 - a. Lever family
 - b. Inclined plane family
4. Define torque. What units is it usually measured in? Name 2 ways to increase torque.
5. A wrench is 0.3m long.
 - a. If you apply 200N of force to the end of the wrench, how much torque will you generate?
 - b. How much force would you need to apply to the end of the wrench to get 100 Nm of torque?
6. Define static equilibrium. Is the lever below in static equilibrium? Explain.



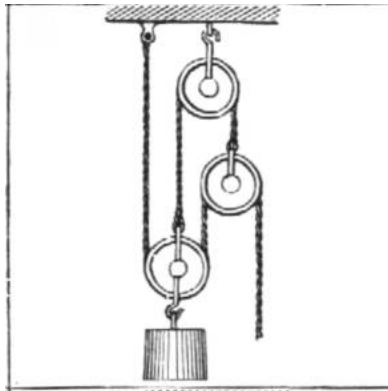
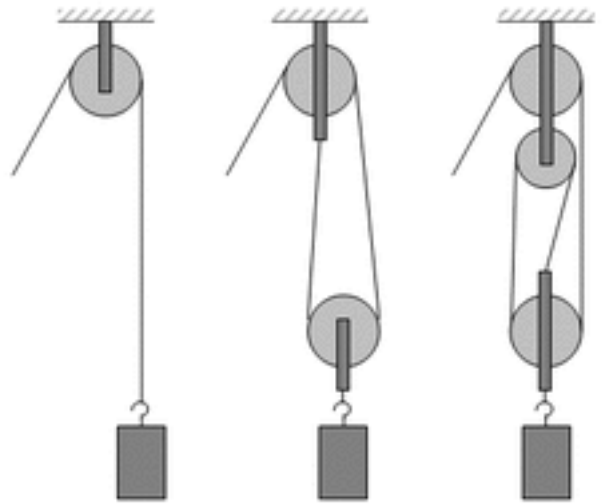
7. If the effort arm of a lever is 20 ft long and you are able to apply 200 lbs of force. How long should the load arm be to lift a 500 lb rock?
8. How much force would you need to apply at each location below to balance the levers?



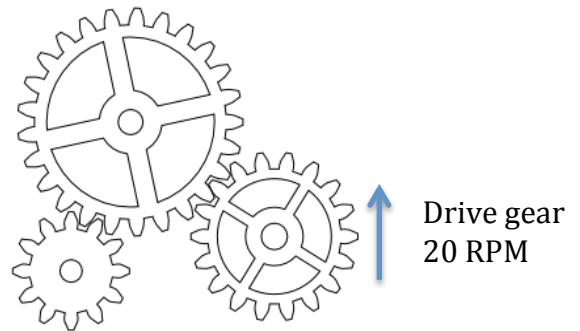
9. How much force would you need to apply to the end of the wheelbarrow handle to lift it?



10. Explain the difference between IMA and AMA
11. You push a 100 kg object up a ramp by applying a force of 400N. If the ramp length is 10m and the height is 2m,
 - a. What is the IMA of the ramp
 - b. What is the AMA of the ramp
 - c. What is the % efficiency of the ramp
 - d. How could you increase the efficiency of the ramp?
12. An axe splits a piece of wood 3 cm and penetrates to a depth of 10 cm. What is the IMA of the axe?
13. Calculate the IMA for each of the pulley systems to the right.
14. If the mass in each pulley system is 10 kg, what force is required to balance each one?
15. You apply a force of 100 lb to lift a 1 ton (2000 lb) mass. What is the AMA of the lever?
16. A lever has an AMA of 20. If you need to lift a 2000 kg car, how much force do you need to apply?
17. Challenge Problem: What is the IMA of the pulley system below? (Hint, it is a compound machine)



18. For the following gear train below:
 - a. Indicate the direction each gear will turn
 - b. Calculate the gear ratio for each pair of gears
 - c. Calculate the speed of each gear
 - d. Calculate the mechanical advantage for the whole gear train.
19. A pulley system with a IMA of 6 is pulls on a lever with an IMA of 0.5
 - a. What is the mechanical advantage of the compound machine?
 - b. If you apply a force of 200 N to the pulley. How much force is the lever able to apply?



**Textbook review questions:
Pg 116-121**