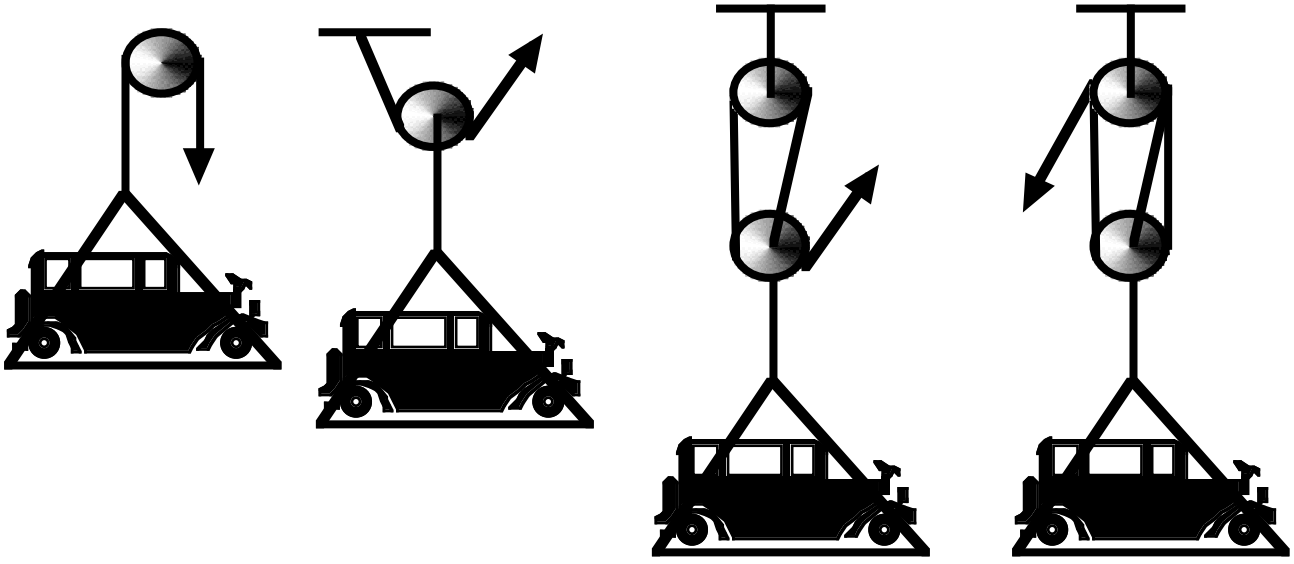
Unit: Machines
Pulley Basics

Different Pulleys: Calculate & Draw

Throughout this practice, the masses will be given in g or kg. Full sentence answers are not necessary, however you answer should completely answer the question.

A. B. C. D.



1. Answer 2 questions for each diagram above. Assume the car is 1500 kg, the effort distance is 4 m and the pulley is perfect (no friction).
   (i) How much effort is needed to lift the car?
   (ii) How far does the car move?

A)

B)

C)

D)

2. Looking at the diagrams above; try to continue the pattern by drawing the next pulley in the sequence (Hint--think about the number of ropes!) We will call it diagram "E."

   E)

3. Draw a pulley arrangement that <u>reduces</u> the force necessary to lift a chicken to:

   (i) one third the resistance (ii) one half the resistance (ii) one quarter of resistance

4. Draw a pulley arrangement that <u>increases the distance</u> you have to pull to lift a crate:

   (i) 2 x (ii) 4 x (ii) 5 x

5. If you had a 3 kg weight and a scale that only went up to 0.5 kg, how many ropes would you need to measure the force required to hold it up? Draw a diagram of your solution.

6. If you had a 4 kg weight and a string that could only hold a force of 1 kg, what is the minimum number of ropes would you need? Draw a diagram of your solution.

7. Draw 2 methods for each situation below (draw one pulley with effort pulling up and one pulley with effort pulling down). For each, draw an apple being lifted up (supported) by:
   a) 3 ropes

   b) 4 ropes

   c) 2 ropes

8. Draw 2 different pulley arrangements that can be used to lift the following requirements (draw one pulley with effort pulling up and one pulley with effort pulling down). Lift...
   a. A barrel using 2 supporting strings;

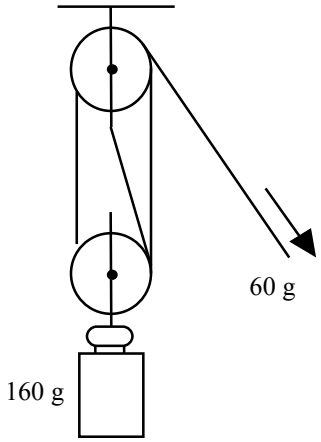
   b. A circle using 3 supporting strings;

   c. A triangle using 4 supporting strings;

   d. A cube using 5 supporting strings;

   e. A cylinder using 7 supporting strings;

9. Use the diagram to complete the questions at right:



a) If the weight goes up 4 inches, what work is done on the resistance?

b) How far will the effort pull?

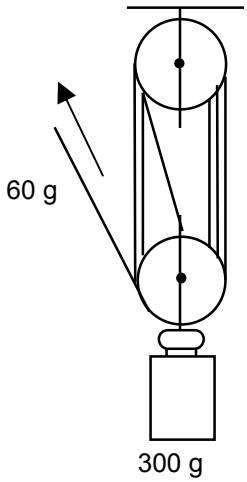
c) What work will the person do who pulls on the rope in making the weight go up 4 inches?

d) What is the IMA of this machine?

e) What is the AMA of this machine?

f) What is the efficiency of this machine?

10. Use the diagram to complete the questions at right:



a) If the weight goes up 4 inches, what work is done on the resistance?

b) How far will the effort pull?

c) What work will the person do who pulls on the rope in making the weight go up 4 inches?

d) What is the IMA of this machine?

e) What is the AMA of this machine?

f) What is the efficiency of this machine?