

Section

8-4

HOLT PHYSICS

Concept Review

Simple Machines

1. If friction is included in the analysis of any machine, the energy put into the machine is more than the work. How is it that simple machines make a task easier?

2. A pulley system with a mechanical advantage of 15 is used to lift a 1750 N piano to a third-floor balcony that is 7.0 m above the ground.
 - a. If friction is negligible, how much work must be done? _____
 - b. What applied force must the movers use? _____
 - c. How much rope will the movers pull in? _____
 - d. If friction is not negligible, is the input energy greater than or less than your answer to part a?

3. Calculate the efficiency of the following.
 - a. $W_{in} = 1850 \text{ J}$, $W_{out} = 1700 \text{ J}$ _____
 - b. an object weighing 150 N is lifted 9.0 m using 1500 J of energy _____
 - c. a force of 150 N is exerted along a 3.0 m inclined plane to raise an object weighing 425 N to a height of 1.0 m _____

4. Explain why a real machine can never have an efficiency of 100 percent.

5. What may be done to increase the efficiency of a real machine?

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