

## Problem 1.2

[Difficulty: 2]

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**1.2** Give a word statement of each of the five basic conservation laws stated in Section 1.4, as they apply to a system.

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**Given:** Five basic conservation laws stated in Section 1-4.

**Write:** A word statement of each, as they apply to a system.

**Solution:** Assume that laws are to be written for a *system*.

- a. Conservation of mass — The mass of a system is constant by definition.
- b. Newton's second law of motion — The net force acting on a system is directly proportional to the product of the system mass times its acceleration.
- c. First law of thermodynamics — The change in stored energy of a system equals the net energy added to the system as heat and work.
- d. Second law of thermodynamics — The entropy of any isolated system cannot decrease during any process between equilibrium states.
- e. Principle of angular momentum — The net torque acting on a system is equal to the rate of change of angular momentum of the system.