Energy Homework Problems:
p113: #2, 22, 23, 26, 27

Problems taken from the school's old textbook:

Giancoli, D. (1980). *Physics*, 2nd Ed. Englewood Cliffs, NJ: Prentice Hall.

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2. A 550-N crate rests on the floor. How much work is required to move it at constant speed
    a) 2.0 m along the floor against a friction force of 150 N?
    b) 2.0 m vertically?

22. A 130-kg load is lifted 30 m vertically by a single cable with an acceleration a = 0.15 g (one "g" is 9.8 m/s^2).
Determine
    a) the tension in the cable
    b) the net work done on the load
    c) the work done by the cable on the load.
    d) the work done by gravity on the load.
    e) the final speed of the load assuming it started from rest.

23. An elevator cable breaks when a 750-kg elevator is 25 m above a huge spring (k=4.0x10^4 N/m) at the
bottom of the shaft. Calculate
    a) the work done by gravity on the elevator before it hits the spring.
    b) the speed of the elevator just before striking the spring.
    c) the amount the spring compresses (Hint: remember that work is done by both the spring and gravity in
        this part).

26. A 1.80-m tall person lifts a 230-g book so it is 2.15 m off the ground. What is the potential energy of the
book relative to
    a) the ground?
    b) the top of the person's head?
    c) How is the work done by the person related to the answers in parts (a) and (b)?

27. A 65-kg hiker starts at an elevation of 1500 m and climbs to the top of a 2600-m peak.
    a) What is the hiker's change in potential energy?
    b) What is the minimum work required of the hiker?
    c) Can the actual work done be more than this? Explain.

ANSWERS:
    2a. 300 J
    2b. 1100 J
    22a. 1465.1 N
    22b. 5733 J
    22c. 43,953 J
    22d. -38,220 J
    22e. 9.39 m/s
    23a. 1.84x10^5 J
    23b. 22.14 m/s
    23c. 3.22 m
    26a. 4.85 J
    26b. .789 J
    26c. Both answers equal the work the person must do in lifting the book in each case.
    27a. 7.01x10^5 J
    27b. 7.01x10^5 J (at minimum, the hiker must do work against gravity; the minimum would occur if the hiker
    ONLY moves vertically upward)
    27c. Yes. It is unlikely the hiker moves vertically upward. In moving sideways he/she will likely encounter
    friction, etc.…