15. There is no acceleration, so the lifting force is equal to the weight of the object. We note that the person's pull $\vec{F}$ is equal (in magnitude) to the tension in the cord.

(a) As indicated in the *hint*, tension contributes twice to the lifting of the canister: $2T = mg$. Since, $|\vec{F}| = T$, we find $|\vec{F}| = 98$ N.

(b) To rise 0.020 m, two segments of the cord (see Fig. 7-28) must shorten by that amount. Thus, the amount of string pulled down at the left end (this is the magnitude of $\vec{d}$, the downward displacement of the hand) is $d = 0.040$ m.

(c) Since (at the left end) both $\vec{F}$ and $\vec{d}$ are downward, then Eq. 7-7 leads to $W = \vec{F} \cdot \vec{d} = (98)(0.040) = 3.9$ J.

(d) Since the force of gravity $\vec{F}_g$ (with magnitude mg) is opposite to the displacement $\vec{d}_c = 0.020$ m (up) of the canister, Eq. 7-7 leads to $W = \vec{F}_g \cdot \vec{d}_c = -(196)(0.020) = -3.9$ J. This is consistent with Eq. 7-15 since there is no change in kinetic energy.