

81. (a) The bottom cord is only supporting a mass of 4.5 kg against gravity, so its tension is  $(4.5)(9.8) = 44$  N.
- (b) The top cord is supporting a total mass of 8.0 kg against gravity, so the tension there is  $(8.0)(9.8) = 78$  N.
- (c) In the second picture, the lowest cord supports a mass of 5.5 kg against gravity and consequently has a tension of  $(5.5)(9.8) = 54$  N.
- (d) The top cord, we are told, has tension 199 N which supports a total of  $199/9.8 = 20.3$  kg, 10.3 of which is accounted for in the figure. Thus, the unknown mass in the middle must be  $20.3 - 10.3 = 10.0$  kg, and the tension in the cord above it must be enough to support  $10.0 + 5.5 = 15.5$  kg, so  $T = (15.5)(9.8) = 152$  N. Another way to analyze this is to examine the forces on the 4.8 kg piece; one of the downward forces on it is this  $T$ .