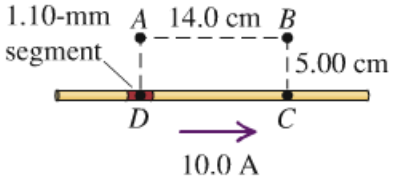
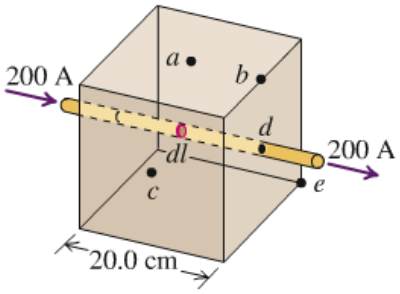
28.11 • A straight wire carries a 10.0-A current (Fig. E28.11). *ABCD* is a rectangle with point *D* in the middle of a 1.10-mm segment of the wire and point *C* in the wire. Find the magnitude and direction of the magnetic field due to this segment at (a) point *A*; (b) point *B*; (c) point *C*.

Figure **E28.11**



28.12 • A long, straight wire, carrying a current of 200 A, runs through a cubical wooden box, entering and leaving through holes in the centers of opposite faces (Fig. E28.12). The length of each side of the box is 20.0 cm. Consider an element *dl* of the wire 0.100 cm long at the center of the box. Compute the magnitude *dB* of the magnetic field produced by this element at the points *a*, *b*, *c*, *d*, and *e* in Fig. E28.12. Points *a*, *c*, and *d* are at the centers of the faces of the cube; point *b* is at the midpoint of one edge; and point *e* is at a corner. Copy the figure and show the directions and relative magnitudes of the field vectors. (*Note:* Assume that the length *dl* is small in comparison to the distances from the current element to the points where the magnetic field is to be calculated.)

Figure **E28.12**



28.7 •• Figure E28.6 shows two point charges, q and q', moving relative to an observer at point P. Suppose that the lower charge is actually *negative,* with $q' = -q$. (a) Find the magnetic field (magnitude and direction) produced by the two charges at point P if (i) $v' = v/2$; (ii) $v' = v$; (iii) $v' = 2v$. (b) Find the direction of the magnetic force that q exerts on q', and find the direction of the magnetic force that q' exerts on q. (c) If $v = v' = 3.00 \times 10^5$ m/s, what is the ratio of the magnitude of the magnetic force acting on each charge to that of the Coulomb force acting on each charge?

Figure **E28.6**