●不可使用電子計算機

1. [15%] As depicted in Fig. 1.
   (a) [5%] Find I_1.
   (b) [5%] Find I_2.
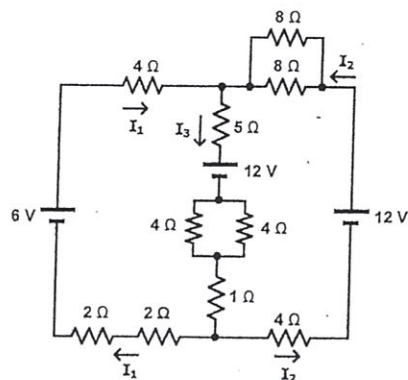   (c) [5%] Find I_3.

Fig. 1

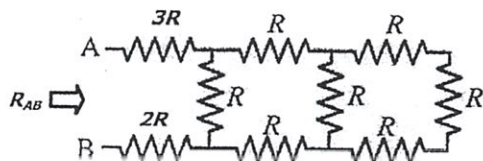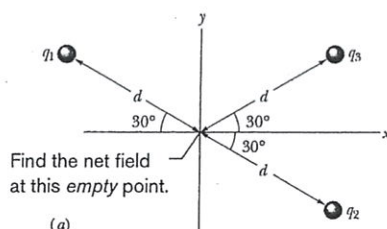2. [15%] Find the R_{AB} as a function of R in Fig. 2.

Fig. 2

3. 20% Figure 3. shows three particles with charges $q_1 = +2Q$, $q_2 = -2Q$, and $q_3 = -4Q$, each a distance d from the origin. What net electric field $\vec{E}$ is produced at the origin?

Find the net field at this *empty* point.

(a)

Fig3.

4.

25% In Fig. 4　block 1 approaches a line of two stationary blocks with a velocity of $v_{1i} = 10$ m/s. It collides with block 2, which then collides with block 3, which has mass $m_3 = 6.0$ kg. After the second collision, block 2 is again stationary and block 3 has velocity $v_{3f} = 5.0$ m/s (Fig. 9-20b). Assume that the collisions are elastic. What are the masses of blocks 1 and 2? What is the final velocity v_{1f} of block 1?

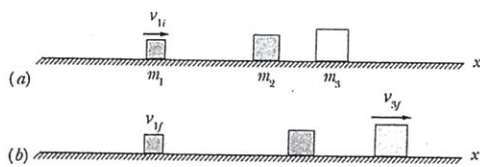
Fig. 4.

5.

25%　In Fig. 5 , a cumin canister of mass $m = 0.40$ kg slides across a horizontal frictionless counter with speed $v = 0.50$ m/s.

It then runs into and compresses a spring of spring constant $k = 750$ N/m. When the canister is momentarily stopped by the spring, by what distance d is the spring compressed?

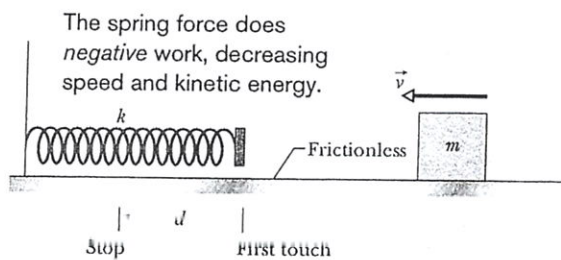The spring force does *negative* work, decreasing speed and kinetic energy.

Figure 5. A canister moves toward a spring.