Note that many questions could be asked of the same situation.  Consider any of the following three charge arrangements.

$Q_0$    $a$

$d$   $Q_0$   $a$
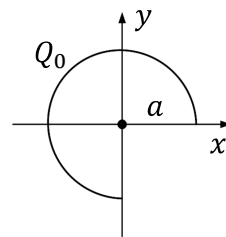
$y$ $(a, 2a)$   $2q_0$   $(-a, a)$   $-q_0$   $(2a, 0)$   $q_0$
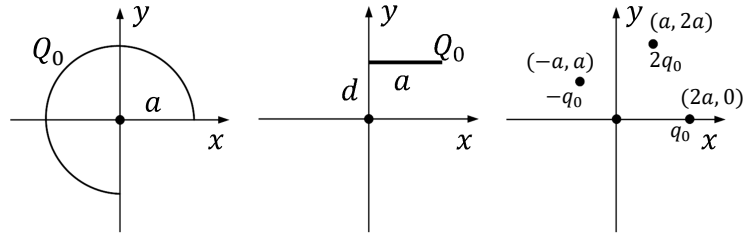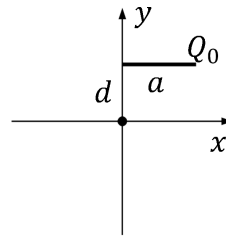
Types of questions that could be asked
• Determine the electric field at the origin
• Determine the force on a charge $q_0$ at the origin
• Determine the electric potential at the origin
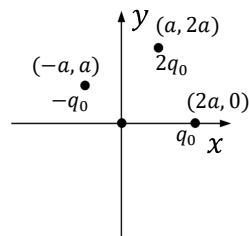• Determine the potential energy of the system

$Q_0$    $a$

$d$   $Q_0$   $a$

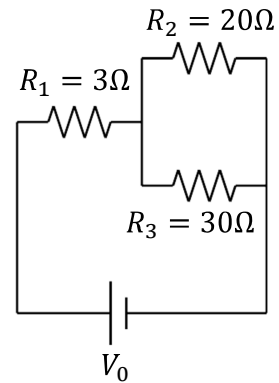$y$ $(a, 2a)$   $2q_0$   $(-a, a)$   $-q_0$   $(2a, 0)$   $q_0$
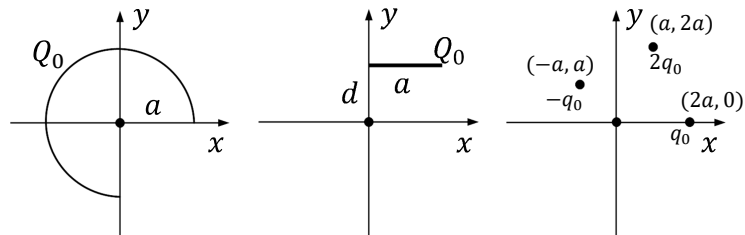
Example: Determine the electric field at the origin.

$Q_0$    $a$
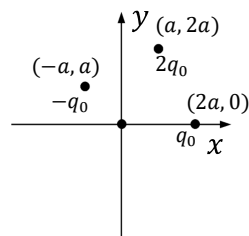
Could have asked for the final speed for a charge $q_0$ released at the origin.

Example: (a) Determine the equivalent resistance of the given circuit.  (b)  The power dissipated by $R_3$ is 480W. Determine $V_0$.

$R_1 = 3\Omega$

$R_2 = 20\Omega$

$R_3 = 30\Omega$

$V_0$

Example: A proton is accelerated from rest through a potential difference of $\Delta V$.  The proton then enters a uniform magnetic field perpendicular to its velocity.  (a) Determine the speed of the proton when it enters the magnetic field.  (b) The proton trajectory has a diameter $D$ in the field.  Determine the magnitude of the magnetic field and the period of the proton's motion.

Example: A small generator consists of a flat square coil of 120 turns and sides of 1.60cm.  The coil rotates in a uniform magnetic field of 0.75mT.  (a) Determine the time dependence of the magnetic flux.  (b) Determine the angular speed of the coil if the maximum emf is 24mV.

Example: A light beam incident on the top surface of a block of plastic ($n_P = 1.49$) makes an angle of $50°$ with respect to normal. Determine the angle the light makes with respect to the normal as it exits the side of the block into water ($n_W = 1.33$).
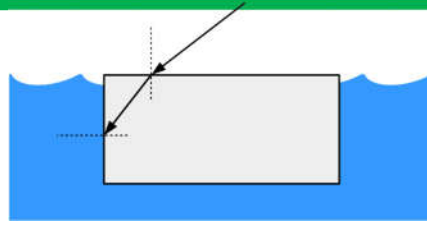
Example: Determine the magnetic field at the origin due to the given circuit.
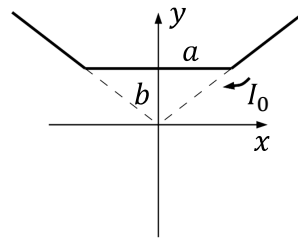
Example: A wire carrying a current $I_W$ runs along a diameter of a solenoid of length $L$ and number of turns $N$ carrying a current $I_S$. Determine the force on the wire.
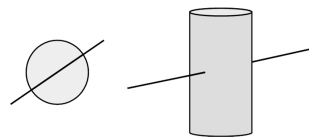
Example: A rod of radius $a$ has a uniform charge per length $\lambda$. A neutral conducting cylindrical shell of inner radius $b$ and outer radius $c$ is coaxial with the charged rod. (a) Determine the electric field for all regions with $r > a$. (b) Determine any induced charges. (c) Determine the potential difference between the rod and the cylindrical shell.