

# Workbook



## Table of Contents

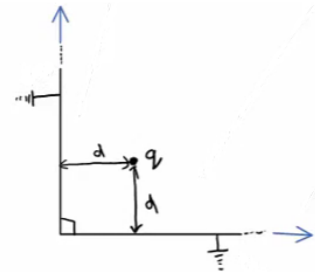
Method Of Images .....	2
Method Of Images .....	2

# Method Of Images

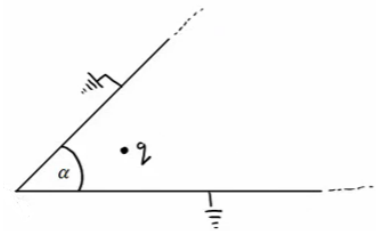
## Method Of Images

### Questions

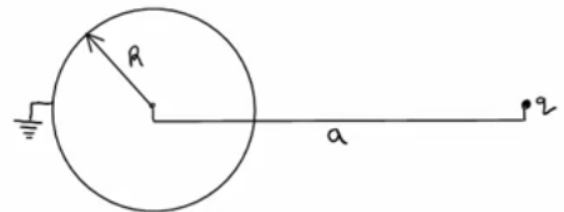
- 1) Two grounded infinite planes are placed at right angles. A charge  $q$  is placed a distance  $d$  from each plane. Calculate the potential.



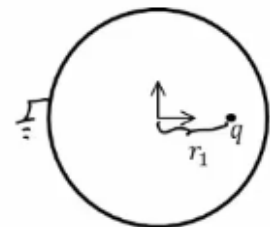
- 2) Two grounded infinite planes are placed at an angle  $\alpha$  relative to one another. A charge  $q$  is placed a distance  $d$  from each plane. Calculate the potential.



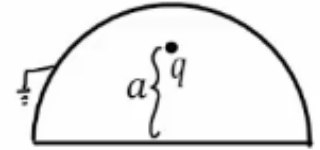
- 3) A charge  $q$  is placed a distance  $a$  away from the center of a grounded sphere of radius  $R$ , where  $a > R$ . Calculate the potential.



- 4) A charge  $q$  is placed a distance  $r_1$  away from the center of the sphere of radius  $R$ , where  $r_1 < R$ . Calculate the potential.



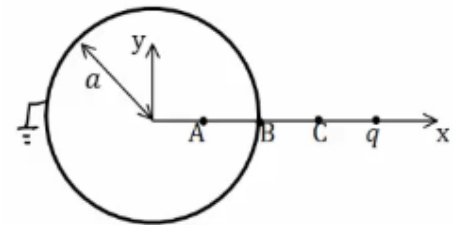
- 5) A point charge  $q$  is placed inside a grounded half sphere, of radius  $R$ . The charge is located at a height  $a$  above the center of the sphere. What is the potential?



- 6) A charge  $q$  is placed along the  $x$ -axis a distance of  $2a$  from the center of a grounded spherical shell of radius  $a$ .

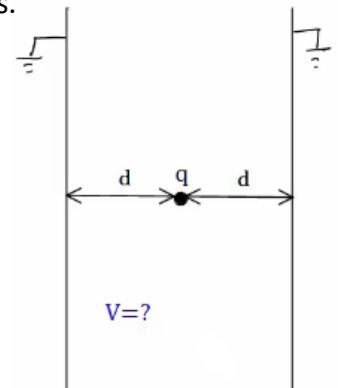
Points A, B and C are also along the  $x$ -axis such that  $x_A = \frac{a}{2}$ ,  $x_B = a$ ,  $x_C = \frac{3a}{2}$ .

- What is the potential at points A, B and C?
- What is the surface charge distribution at B?
- Calculate the force acting on  $q$ .
- What is the energy required to build the system?



- 7) A charge  $q$  is placed a distance  $d$  away from two grounded infinite planes.

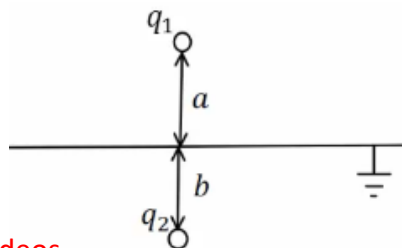
- Calculate the potential in the region between the two planes.
- What is the energy required to build the system?
- What is the energy required to bring charge  $q$  from infinity?



- 8) Charge  $q_1$  is located a distance  $a$  above an infinite grounded plane.

Charge  $q_2$  is located a distance  $b$  below the plane.

- What is the electric field and potential throughout?
- What is the charge distribution on the plane, and what is the total charge on the plane?



\*For the solutions go see the videos