

## Phys221 Assignment #1

Due: 10:20am Friday May 8, 2009

1. Textbook page 44, # 2.5.

2. A solid sphere with a radius  $R$  is uniformly charged. The charge density (charge per unit volume) is  $\rho$ . Figure A below depicts its cross section on the  $x$ - $y$  plane. The centre of the sphere is at the origin.

(a) Determine the electric field  $E$  at point  $P(2R/3, 0, 0)$ .

(b) A spherical cavity of radius  $R/2$  is created as shown in figure B. The centre of the cavity is located at  $(R/2, 0, 0)$ . Determine the electric field inside the cavity at point  $P(2R/3, 0, 0)$ .

(c) If the cavity inside the sphere has a radius  $w$  and the centre of the cavity is located at  $(a, b, 0)$ , find the electric field at a point  $(x, y, 0)$  inside the cavity.

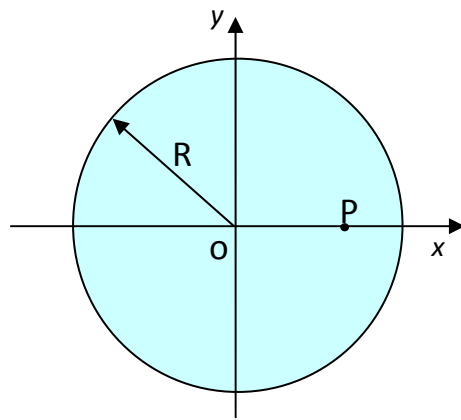


Figure A

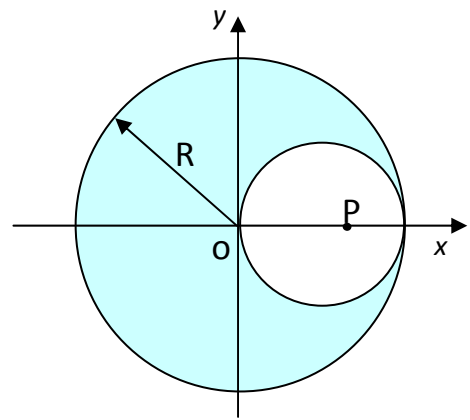


Figure B