

# Mathematical Physics — PHZ 3113

Classwork 11 (March 25, 2013)

Dirac delta function (distribution)

1A. Calculate

$$I = \int_{-\pi}^{+\pi} d\phi \delta \left[ \phi \left( \phi^2 - \frac{\pi^2}{4} \right) \right] \cos(\phi).$$

1B. Calculate

$$I = \int_{-\pi}^{+\pi} d\phi \delta \left[ \phi \left( \phi^2 - \frac{\pi^2}{16} \right) \right] \cos(\phi).$$

2. The total charge on the infinitely thin conducting surface of a sphere of radius  $r_0$  is  $Q$ . Write down the charge density  $\rho(r, \theta, \phi)$ .