## Module 8 self-assessment

**Question 1**

Evaluate the double integral

$$\iint_R \mathrm{e}^{\frac{y-x}{y+x}}\,\mathrm{d}A$$

over the region $R$ within a triangle with vertices $(0,0)$, $(0,1)$ and $(1,0)$.

**Question 2**

Using double integrals show that the geometric centre of a triangle with vertices $(0,0)$, $(1,3)$ and $(3,-1)$ has coordinates $\left(\frac{4}{3},\frac{2}{3}\right)$.

**Question 3**

Find the centre of mass of a unit disk centred at the origin, if its right half is twice as dense as the left half. Give your answer parametrically in terms of the density $\rho$, taking for example the density on the left as $\rho$ and on the right as $2\rho$.