S4. Solve by the use of integrating factors:

(a)

$$\frac{\mathrm{d}y}{\mathrm{d}x} + 2xy = 4x\,.$$

(b)

$$\frac{\mathrm{d}y}{\mathrm{d}x} + (2 - 3x^2)x^{-3}y = 1\,.$$

Standard questions

5. Solve by change of variables and separation:

$$(x + y + 1)^2 \frac{\mathrm{d}y}{\mathrm{d}x} + (x + y + 1)^2 + x^3 = 0\,.$$

6. Solve by change of variables and the use of integrating factors:

(a)

$$\frac{\mathrm{d}y}{\mathrm{d}x} - y = xy^5\,.$$

(b)

$$\frac{\mathrm{d}y}{\mathrm{d}x} + y = y^2(\cos x - \sin x)\,.$$