7 **(a)** Show that $\frac{\mathrm{d}}{\mathrm{d}x}\left(\frac{1}{2}x\sqrt{4-x^2}+2\sin^{-1}\left(\frac{1}{2}x\right)\right)=\sqrt{4-x^2}$. [3]

(b) Find the solution of the differential equation

$$2\frac{\mathrm{d}y}{\mathrm{d}x}+\frac{y}{2+x}=2\sqrt{2-x}$$

for which $y=\frac{1}{2}$ when $x=1$. Give your answer in an exact form. [8]