

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

[3]

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

(b) Find the solution of the differential equation

$$2\frac{dy}{dx} + \frac{y}{2+x} = 2\sqrt{2-x}$$

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

[8]

This image shows a blank sheet of white paper with ten horizontal dashed lines spaced evenly apart, resembling notebook paper. The lines are thin and black, extending across the full width of the page. There is no handwriting or other markings on the paper.

