4. Given that

$$y = \arcsin x \qquad -1 \leqslant x \leqslant 1$$

(a) show that

$$\frac{dy}{dx} = \frac{1}{\sqrt{1 - x^2}}$$

(3)

Given that

$$f(x) = \frac{3x + 2}{\sqrt{4 - x^2}}$$

(b) show that the mean value of $f(x)$ over the interval $\left[0, \sqrt{2}\right]$ is

$$\frac{\pi\sqrt{2}}{4} + A\sqrt{2} - A$$

where A is a constant to be determined.

(6)