4. (a) Find the first three terms, in ascending powers of x, of the binomial expansion of

$$\frac{1}{\sqrt{4 - x}}$$

giving each coefficient in its simplest form.

(4)

The expansion can be used to find an approximation to $\sqrt{2}$

Possible values of x that could be substituted into this expansion are:

- $x = -14$ because $\dfrac{1}{\sqrt{4 - x}} = \dfrac{1}{\sqrt{18}} = \dfrac{\sqrt{2}}{6}$

- $x = 2$ because $\dfrac{1}{\sqrt{4 - x}} = \dfrac{1}{\sqrt{2}} = \dfrac{\sqrt{2}}{2}$

- $x = -\dfrac{1}{2}$ because $\dfrac{1}{\sqrt{4 - x}} = \dfrac{1}{\sqrt{\dfrac{9}{2}}} = \dfrac{\sqrt{2}}{3}$

(b) Without evaluating your expansion,

   (i) state, giving a reason, which of the three values of x should not be used

(1)

   (ii) state, giving a reason, which of the three values of x would lead to the most accurate approximation to $\sqrt{2}$

(1)