

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

$$\frac{1}{\sqrt{9-x}}$$

giving each coefficient in its simplest form.

(4)

The expansion can be used to find an approximation to $\sqrt{3}$

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

- $x = -\frac{2}{3}$ because $\frac{1}{\sqrt{9-x}} = \frac{\sqrt{3}}{5}$
- $x = 6$ because $\frac{1}{\sqrt{9-x}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$
- $x = -18$ because $\frac{1}{\sqrt{9-x}} = \frac{1}{\sqrt{27}} = \frac{\sqrt{3}}{9}$

(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 $\sqrt{3}$.

(1)

(Total for Question 4 is 6 marks)