

6 Given that  $\sqrt{9-x}$  can be expressed in the form  $p(1+qx)^{\frac{1}{2}}$  where  $p$  and  $q$  are constants

(a) find the value of  $p$  and the value of  $q$ .

(2)

(b) Hence expand  $\sqrt{9-x}$  in ascending powers of  $x$  up to and including the term in  $x^3$  expressing each coefficient as an exact fraction in its lowest terms.

(3)

Using the expansion you found in part (b) with a suitable value of  $x$ ,

(c) find an estimate to 5 decimal places for the value of  $\sqrt{\frac{31}{4}}$

(3)

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**(Total for Question 6 is 8 marks)**

