

STEP II, 2007, Q1

- 1 *In this question, you are not required to justify the accuracy of the approximations.*
- (i) Write down the binomial expansion of $\left(1 + \frac{k}{100}\right)^{\frac{1}{2}}$ in ascending powers of k , up to and including the k^3 term.
- (a) Use the value $k = 8$ to find an approximation to five decimal places for $\sqrt{3}$.
- (b) By choosing a suitable integer value of k , find an approximation to five decimal places for $\sqrt{6}$.
- (ii) By considering the first two terms of the binomial expansion of $\left(1 + \frac{k}{1000}\right)^{\frac{1}{3}}$, show that $\frac{3029}{2100}$ is an approximation to $\sqrt[3]{3}$.



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