

You have now reached the end of the programme, except for the test exercise which follows. The questions are all straightforward and you will have no trouble with them. Work through all the questions at your own speed. There is no need to hurry.

Test Exercise—XII

1. State Maclaurin's series.
2. Find the first 4 non-zero terms in the expansion of $\cos^2 x$.
3. Find the first 3 non-zero terms in the series for $\sec x$.
4. Show that $\tan^{-1} x = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots$
5. Assuming the series for e^x and $\tan x$, determine the series for $e^x \cdot \tan x$ up to and including the term in x^4 .
6. Evaluate $\sqrt{1.05}$ correct to 5 significant figures.
7. Find
 - (i) $\lim_{x \rightarrow 0} \left\{ \frac{1 - 2 \sin^2 x - \cos^3 x}{5x^2} \right\}$
 - (ii) $\lim_{x \rightarrow 0} \left\{ \frac{\tan x \cdot \tan^{-1} x - x^2}{x^6} \right\}$
 - (iii) $\lim_{x \rightarrow 0} \left\{ \frac{x - \sin x}{x - \tan x} \right\}$
8. Expand $\cos(x + h)$ as a series of powers of h and hence evaluate $\cos 31^\circ$ correct to 5 decimal places.

You are now ready to start the next programme.