2014 Q9

9. Give the first three non-zero terms of the Maclaurin series for \( \cos 3x \). Write down the first four terms of the Maclaurin series for \( e^{2x} \). Hence, or otherwise, determine the Maclaurin series for \( e^{2x}\cos 3x \) up to, and including, the term in \( x^3 \).

Answers

\[
\cos 3x = 1 - \frac{9x^2}{2} + \frac{27x^4}{8} \ldots
\]

\[
e^{2x}\cos 3x = 1 + 2x - \frac{5x^2}{2} - \frac{23x^3}{3}
\]