## Some expansions

http://mathworld.wolfram.com/SeriesExpansion.html

$$
\begin{gathered}
\frac{1}{1-x}=1+x+x^{2}+x^{3}+x^{4}+x^{5}+\ldots \text { for }-1<x<1 \\
\cos x=1-\frac{1}{2} x^{2}+\frac{1}{24} x^{4}-\frac{1}{720} x^{6}-\ldots \text { for }-\infty<x<\infty \\
\cos ^{-1} x=\frac{1}{2} \pi-x-\frac{1}{6} x^{3}-\frac{3}{40} x^{5}-\frac{5}{112} x^{7}-\ldots \text { for }-1<x<1 \\
e^{x}=1+x+\frac{1}{2} x^{2}+\frac{1}{6} x^{3}+\frac{1}{24} x^{4}+\ldots \text { for }-\infty<x<\infty \\
\sin x=x-\frac{1}{6} x^{3}+\frac{1}{120} x^{5}-\frac{1}{5040} x^{7}+\ldots \text { for }-\infty<x<\infty \\
\sin ^{-1} x=x+\frac{1}{6} x^{3}+\frac{3}{40} x^{5}+\frac{5}{112} x^{7}+\frac{35}{1152} x^{9}+\ldots \\
\ln (1+x)=x-\frac{1}{2} x^{2}+\frac{1}{3} x^{3}-\frac{1}{4} x^{4}+\ldots \text { for }-1<x<1 \\
\ldots \text { and many, many more. }
\end{gathered}
$$

A very useful approximation: $\quad(1 \pm x)^{m}=1 \pm m x$

