Power Series

Series	Summation	Expanded	Radius, Interval of conv.
Taylor/ Maclaurin	$\sum_{n\geq 0} \frac{f^{(n)}(a)}{n!}(x-a)^n$	$a=0$ if Maclaurin	R
Power Series	$\sum_{n\geq 0} c_n(x-a)^n$	-	Special Case: $R=\lim_{n\to\infty}\left\lvert\frac{c_n}{c_{n+1}}\right\rvert=\lim_{n\to\infty}\frac{1}{\sqrt[n]{\lvert c_n\rvert}}$ For all series: $\lim_{n\to\infty}\left\lvert\frac{a_{n+1}}{a_n}\right\rvert<1$
$\frac{1}{1-x}$	$\sum_{n\geq 0} x^n$	$1+x+x^2+\cdots$	$R=1$
$\frac{1}{1+x}$	$\sum_{n\geq 0}(-1)^n x^n$	$1-x+x^2-x^3+\cdots$	$R=1$
e^x	$\sum_{n\geq 0}\frac{x^n}{n!}$	$1+x+\frac{1}{2!}x^2+\frac{1}{3!}x^3+\cdots$	$R=\infty$
$\sin x$	$\sum_{n\geq 0}(-1)^n\frac{x^{2n+1}}{(2n+1)!}$	$x-\frac{1}{3!}x^3+\frac{1}{5!}x^5-\cdots$	$R=\infty$
$\cos x$	$\sum_{n\geq 0}(-1)^n\frac{x^{2n}}{(2n)!}$	$1-\frac{1}{2!}x^2+\frac{1}{4!}x^4-\cdots$	$R=\infty$
$(1+x)^k$	$\sum_{n\geq 0}\binom{k}{n}x^n$	$1+kx+\frac{1}{2!}k(k-1)x^2+\cdots$	$R=1$
$\arctan x$	$\sum_{n\geq 0}(-1)^n\frac{x^{2n+1}}{2n+1}$	$x-\frac{1}{3}x^3+\frac{1}{5}x^5-\cdots$	$R=1$
$\ln(1+x)$	$\sum_{n\geq 0}(-1)^{n+1}\frac{x^n}{n}$	$x-\frac{1}{2}x^2+\frac{1}{3}x^3-\cdots$	$R=1$
Can be useful if the question asks			
$\ln(1-x)$	$-\sum_{n\geq 1}\frac{x^n}{n}$		
$\ln\left(\frac{1-x}{1+x}\right)$	$2\sum_{n\geq 0}\frac{x^{2n+1}}{2n+1}$		
$\arcsin x$	$x+\sum_{n\geq 1}\frac{(2n-1)!!}{(2n)!!}\frac{x^{2n+1}}{2n+1}=\sum_{n\geq 0}\frac{(2n)!}{2^{2n}(n!)^2}\frac{x^{2n+1}}{2n+1}$		
$\arccos x$	$\frac{\pi}{2}-\arcsin x$		
Super useful for bypassing			
Fresnel Int. $S(x)$	$\int_0^x \sin t^2\,\mathrm{d}t=\sum_{n\geq 0}(-1)^n\frac{x^{4n+3}}{(2n+1)!\,(4n+3)}$		$R=\infty$
Fresnel Int. $C(x)$	$\int_0^x \cos t^2\,\mathrm{d}t=\sum_{n\geq 0}(-1)^n\frac{x^{4n+1}}{(2n)!\,(4n+1)}$		$R=\infty$