TAYLOR SERIES

1. Find the *nth* degree Taylor polynomial for $f(x) = \frac{1}{x+1}$ about $x = 1$. Include sigma notation.

2. The table below shows how well the Taylor polynomials approximate the value of $f(x)$ for various values of *x*. What do you notice?

ERRORS	$P_1(x)$	$P_2(x)$	$P_3(x)$	$P_4(x)$	$P_5(x)$	$P_6(x)$	$P_7(x)$
$x = 0$	0.25000000	0.12500000	0.06250000	0.03125000	0.01562500	0.00781250	0.00390625
$x = 0.4$	0.06428571	0.01928571	0.00578571	0.00173571	0.00052071	0.00015621	0.00004686
$x = 0.8$	0.00555556	0.00055556	0.00005556	0.00000556	0.00000056	0.00000006	0.00000001
$x = 1$	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000
$x = 1.4$	0.01666667	-0.00333333	0.00066667	-0.00013333	0.00002667	-0.00000533	0.00000107
$x = 1.8$	0.05714286	-0.02285714	0.00914286	-0.00365714	0.00146286	-0.00058514	0.00023406
$x = 2.2$	0.11250000	-0.06750000	0.04050000	-0.02430000	0.01458000	-0.00874800	0.00524880
$x = 3.2$	0.28809524	-0.31690476	0.34859524	-0.38345476	0.42180024	-0.46398026	0.51037829
$x = 3.4$	0.32727273	-0.39272727	0.47127273	-0.56552727	0.67863273	-0.81435927	0.97723113

3. Create an infinite series by letting $n \to \infty$. Find the interval of convergence for this series.

4. When the infinite series converges, what does it seem to converge to?