Maclaurin & Taylor polynomials & series

1. Find the fourth degree Maclaurin polynomial for the function $f(x) = \ln(x+1)$.

$f(x) = \ln(x+1)$	$f(0) =$
$f'(x) =$	$f'(0) =$
$f''(x) =$	$f''(0) =$
$f^{(3)}(x) =$	$f^{(3)}(0) =$
$f^{(4)}(x) =$	$f^{(4)}(0) =$

Use the above calculations to write the fourth degree Maclaurin polynomial for $\ln(x+1)$.

$p_4(x) =$

Now write the Maclaurin *series* for $\ln(x+1)$.

2. Find the fourth degree Taylor polynomial at $x = 1$ for the function $g(x) = \sqrt{x}$.

$g(x) = \sqrt{x}$	$g(1) =$
$g'(x) =$	$g'(1) =$
$g''(x) =$	$g''(1) =$
$g^{(3)}(x) =$	$g^{(3)}(1) =$
$g^{(4)}(x) =$	$g^{(4)}(1) =$

Use the above calculations to write the fourth degree Taylor polynomial at $x = 1$ for $\sqrt{x}$.

$p_4(x) =$

Note: There isn't an obvious "nice" pattern, so don't worry about writing the Taylor series for this one.

3. Find the second degree Taylor polynomial at $x = 2$ for the function $h(x) = x^2 + 3x - 1$.

4. Use your work from the front page to write the first, second, third, and fourth degree Taylor polynomials at $x = 1$ for the function $g(x) = \sqrt{x}$.

$p_1(x) =$

$p_2(x) =$

$p_3(x) =$

$p_4(x) =$

Now evaluate each of these polynomials at $x = 1.21$, $x = 1.96$, and $x = 16$.

$p_1(1.21) =$	$p_1(1.96) =$	$p_1(16) =$
$p_2(1.21) =$	$p_2(1.96) =$	$p_2(16) =$
$p_3(1.21) =$	$p_3(1.96) =$	$p_3(16) =$
$p_4(1.21) =$	$p_4(1.96) =$	$p_4(16) =$
$\sqrt{1.21} =$	$\sqrt{1.96} =$	$\sqrt{16} =$