

TI-84+ Lab 13 For Mathematics 224

Topic: Taylor polynomial approximation near 0

Taylor Polynomial Approximation Near Zero. Approximate and calculate exact values for $f(x) = e^x$ near $x = 0$.

Taylor polynomials of increasing degree, $P_1(x), P_2(x), P_3(x)$ and $f(x)$ evaluated at various values of x :

x	$P_1(x)$ Approximation $1 + x$	$P_2(x)$ Approximation $1 + x + \frac{1}{2}x^2$	$P_3(x)$ Approximation $1 + x + \frac{1}{2}x^2 + \frac{1}{6}x^3$	Exact $f(x) = e^x$
-1	0	0.5	0.33333	0.36788
-0.1	0.9	0.905	0.90483	0.90484
-0.01	0.99	0.99005	0.99005	0.99005
-0.001	0.999	0.9990005	0.9990005	0.9990005
0	1	1	1	1
0.001	1.001	1.001	1.001001	1.001001
0.01	1.01	1.01005	1.010050	1.010050
0.1	1.1	1.105	1.105167	1.10517
1	2	2.5	2.666667	2.71828

Define $Y_1 = 1 + X$, $Y_2 = Y_1 + \frac{X^2}{2}$, $Y_3 = Y_2 + \frac{X^3}{6}$, $Y_4 = e^X$
 2nd TBLSET -1 1 Ask Auto 2nd TABLE, type -1 -0.1 -0.01 ...