*with* ( *LinearAlgebra* ) *with* ( *VectorCalculus* ) *with* ( *Student* [ *Calculus1* ] ) *with* ( *plots* ) :
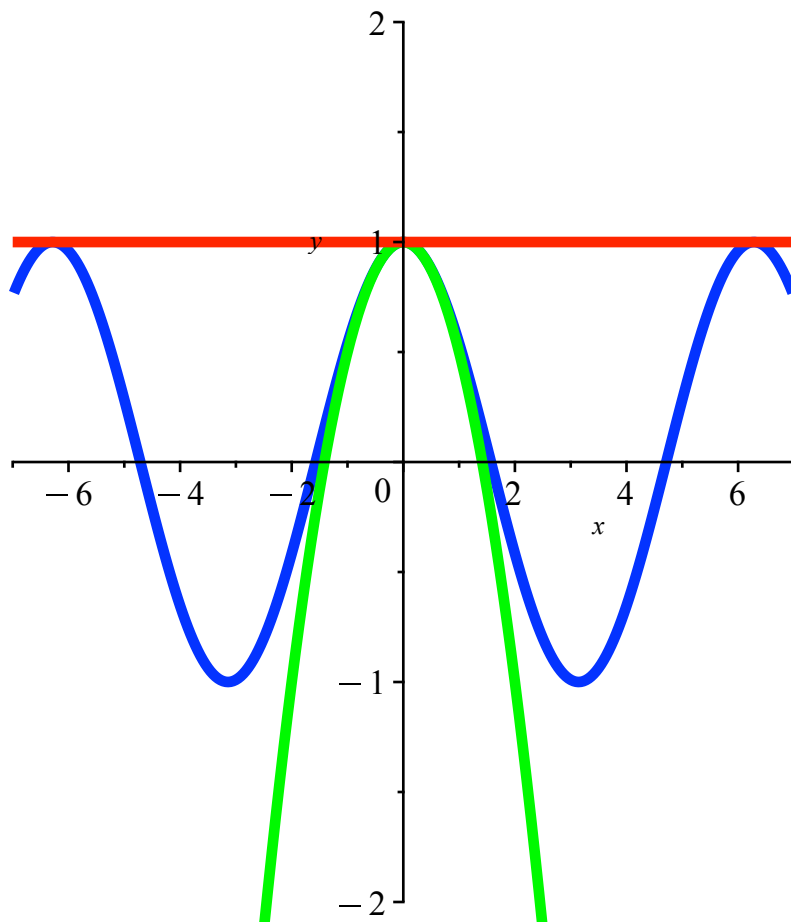
# Taylor approximations

## One variable

$f := \cos(x)$

$$f := \cos(x) \tag{1}$$

$t2 := taylor(f, x = 0, 3)$

$$t2 := 1 - \frac{1}{2} x^2 + O(x^4) \tag{2}$$

$plot([f, t2, 1], x = -7..7, y = -2..2, color = [blue, green, red], thickness = 4)$



## Two variables

$f := \cos(x + y)$

$$f := \cos(x + y) \tag{3}$$

$T2 := mtaylor(f, [x = 0, y = 0], 3)$

$$T2 := 1 - \frac{1}{2} x^2 - y x - \frac{1}{2} y^2 \tag{4}$$

$s := plot3d(f, x = -5\,..5, y = -5\,..5, view = -2\,..2, color = blue):$
$t := plot3d(T2, x = -5\,..5, y = -5\,..5, view = -2\,..2, color = green):$
$l := plot3d(1, x = -5\,..5, y = -5\,..5, view = -2\,..2, color = red):$
$display(s, t, l)$