> **First a 1 variable exmaple**

> *restart*;

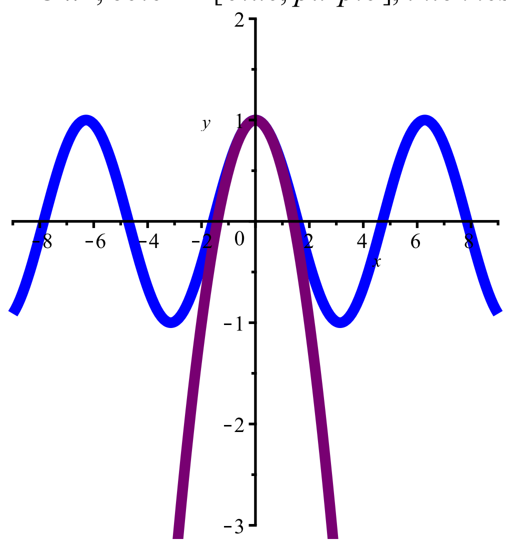
> *with*(*plots*) :

> $g := \cos(x);\ Tg := 1 - \frac{x^2}{2};$

$$g := \cos(x)$$

$$Tg := 1 - \frac{x^2}{2} \qquad (1)$$

> $plot([g, Tg], x = -9..9, y = -3..2, color = [blue, purple], thickness = 4);$



> *Now a* 2 − *variable example* : *Example* 2, *Adams* **and** *Essex Section* 12.9

> $f := \mathrm{sqrt}(x^2 + y^3);$

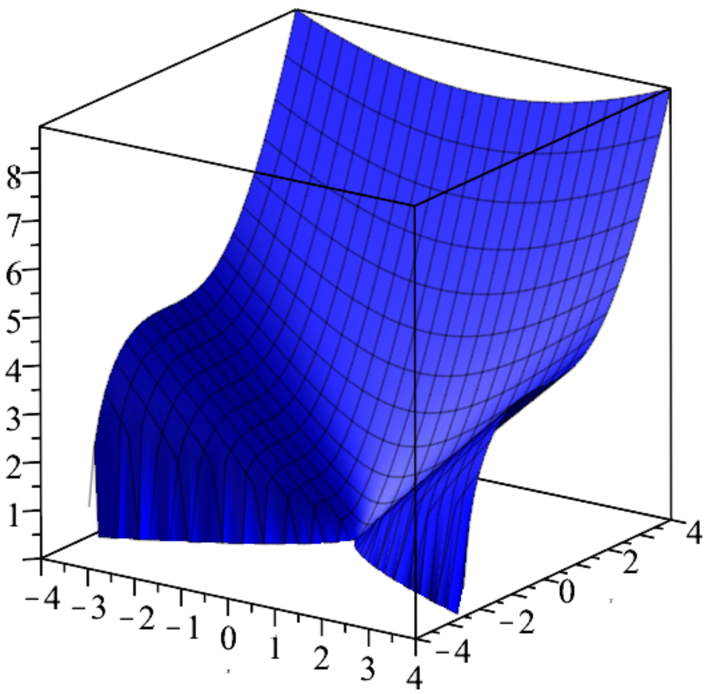
$$f := \sqrt{y^3 + x^2} \qquad (2)$$

> **Here is the Taylor polynomial centered at (x,y) = (1,2). Computed by hand or with the maple command**

> $T2f := mtaylor(f, [x = 1, y = 2], 3);$

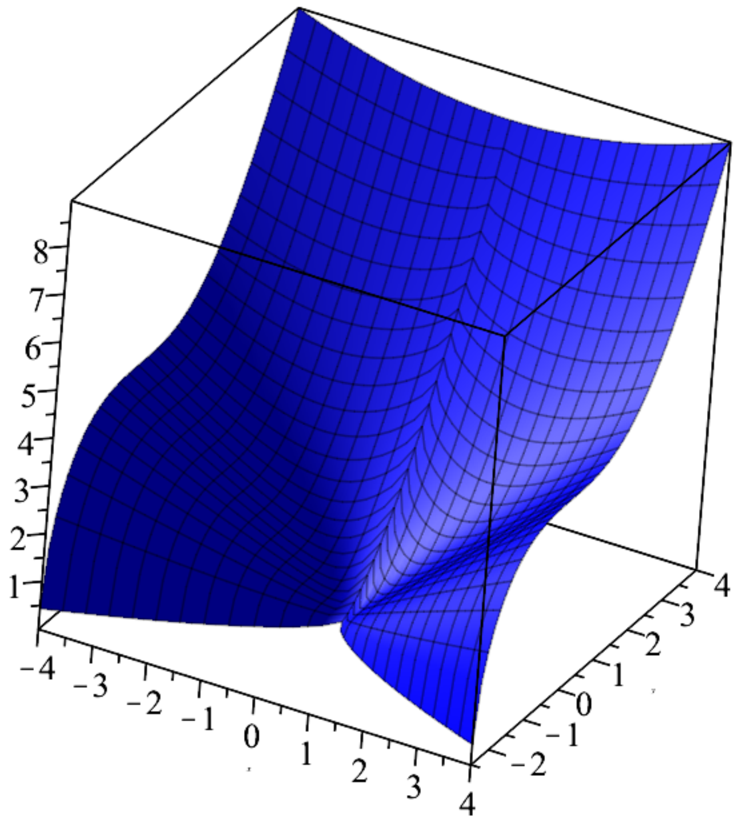
$$T2f := -\frac{4}{3} + 2\,y + \frac{x}{3} + \frac{4\,(x-1)^2}{27} - \frac{2\,(y-2)\,(x-1)}{9} + \frac{(y-2)^2}{3} \qquad (3)$$

> $plot3d(f, x = -4..4, y = -4..4, color = blue);$

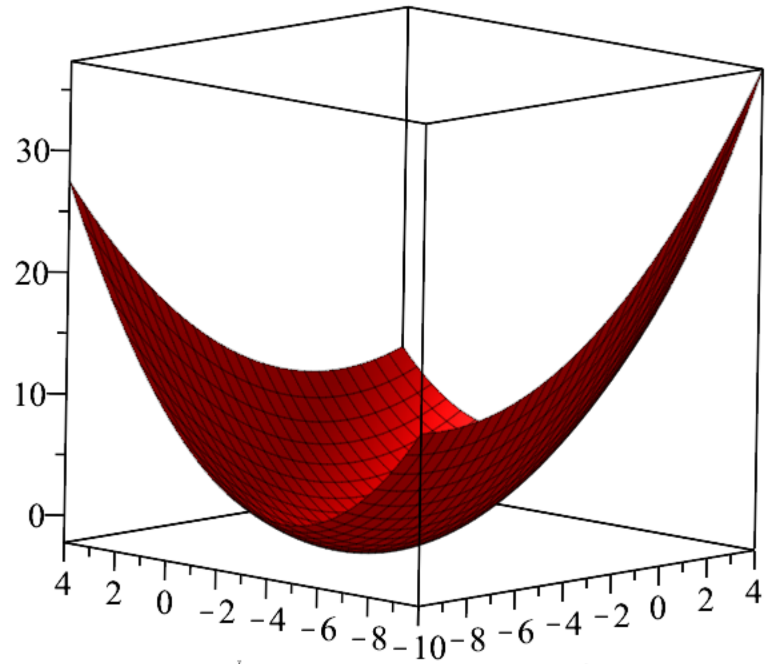


> **Looks better if plotted over its domain with a 0.01 fudge facter to stop the jagged edges.**

> $fplot := plot3d\left(f, x = -4 \,..\, 4, y = -\left(\left(x^2\right)^{\frac{1}{3}}\right) + 0.01 \,..\, 4, color = blue\right);$

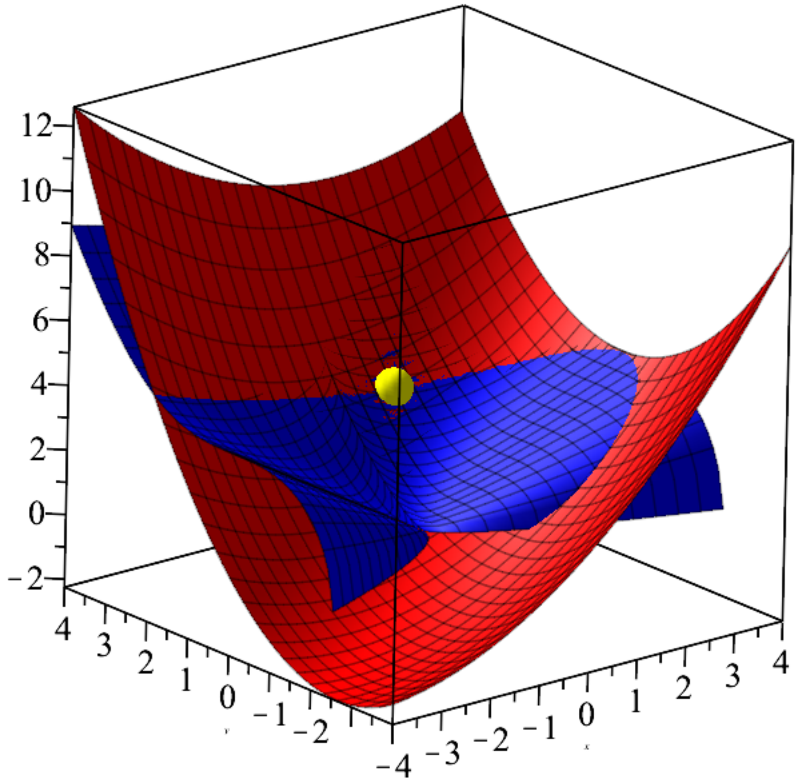


> $Tplot := plot3d(Tf, x = -10..4, y = -10..4, color = red);$



> $P := pointplot3d([1, 2, 3], symbol = solidcircle, symbolsize = 40, color = yellow)$:

> $display([fplot, Tplot, P])$;



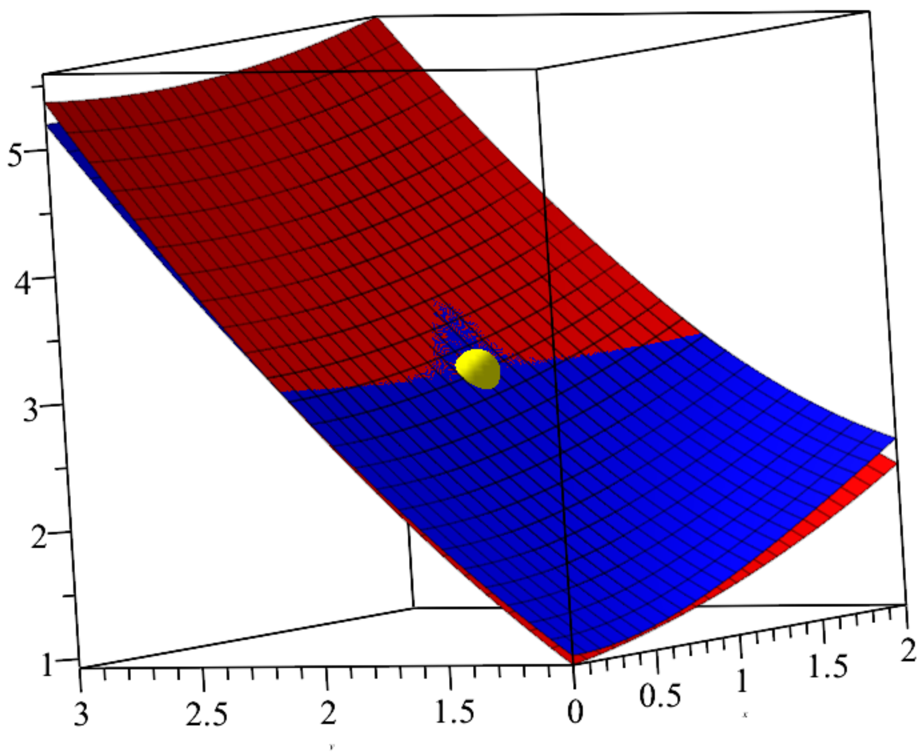
> **Zooming in at point of approximation.**

>

> $fplot2 := plot3d(f, x = 0 ..2, y = 1 ..3, color = blue)$:

> $Tplot2 := plot3d(Tf, x = 0 ..2, y = 1 ..3, color = red)$:

> $display([fplot2, Tplot2, P]);$



(4)