ex in how many different ways can we all line up (18 of us)?

$18! = 18 \cdot 17 \cdot 16 \cdot 15 \cdot 14 \cdot \cdots \cdot 1$

Def $n!$, read as n factorial.

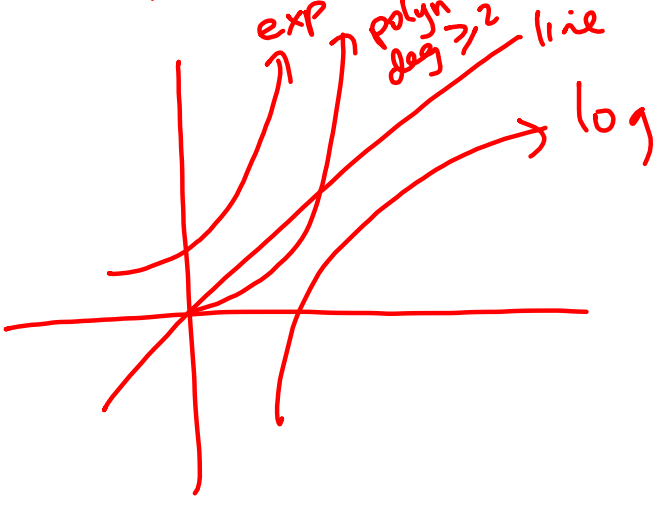
$n! = n(n-1)(n-2)(n-3)\cdots(3)(2)(1)$

note: for now factorials are limited to positive integers.

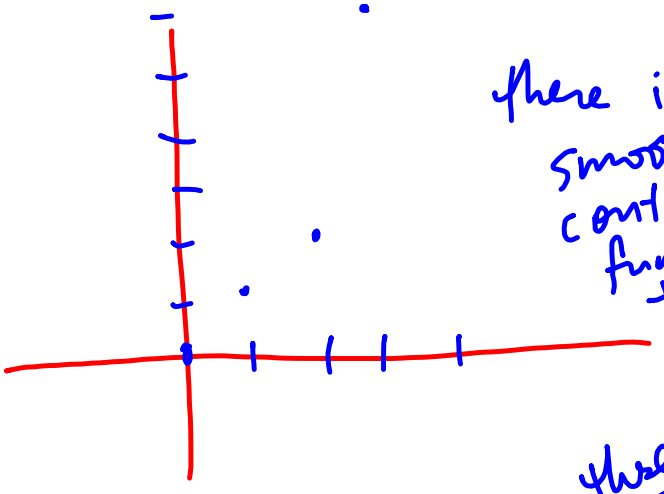
note: $0! := 1$

note: in a TI 84 goto the math menu → PRB → !

tangent:



$y = x!$ domain $\{\mathbb{Z} \geq 0\}$



there is a smooth continuous function that goes through these points

Γ function

ex $\frac{10!}{9!} = 10$

ex $\frac{10!}{7!} = 10 \cdot 9 \cdot 8$ || ex $\frac{10!}{6!} = 10 \cdot 9 \cdot 8 \cdot 7$ $\mathbb{R}$

ex let $k < n$ and k, n are $\mathbb{Z}$

$\frac{n!}{k!} = n \cdot (n-1) \cdots (k+1)$ || $\frac{5!}{3!} = 5 \cdot 4$

ex $(3+7)! = 10! \neq 3! + 7!$

ex $(3!)! = (6)! = 720$