

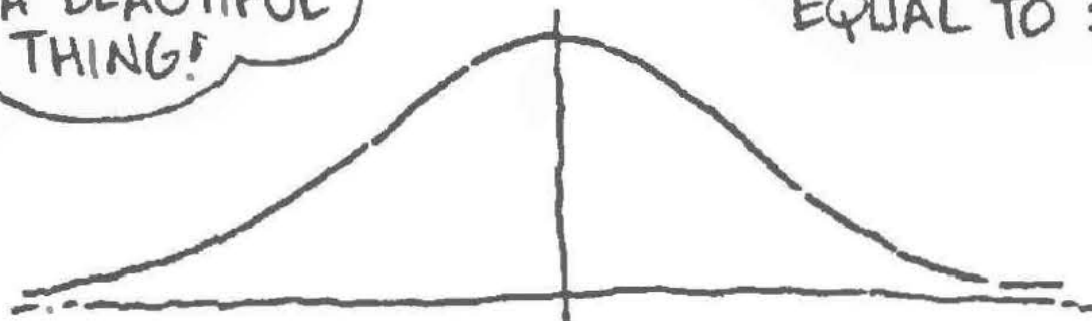
$$f(z) = \frac{1}{\sqrt{2\pi}} e^{-\frac{z^2}{2}}$$

THIS FUNCTION IS CALLED THE  
**standard normal  
distribution.**

( $e$  IS A USEFUL MATHEMATICAL  
CONSTANT APPROXIMATELY  
EQUAL TO 2.718.)



A BEAUTIFUL  
THING!

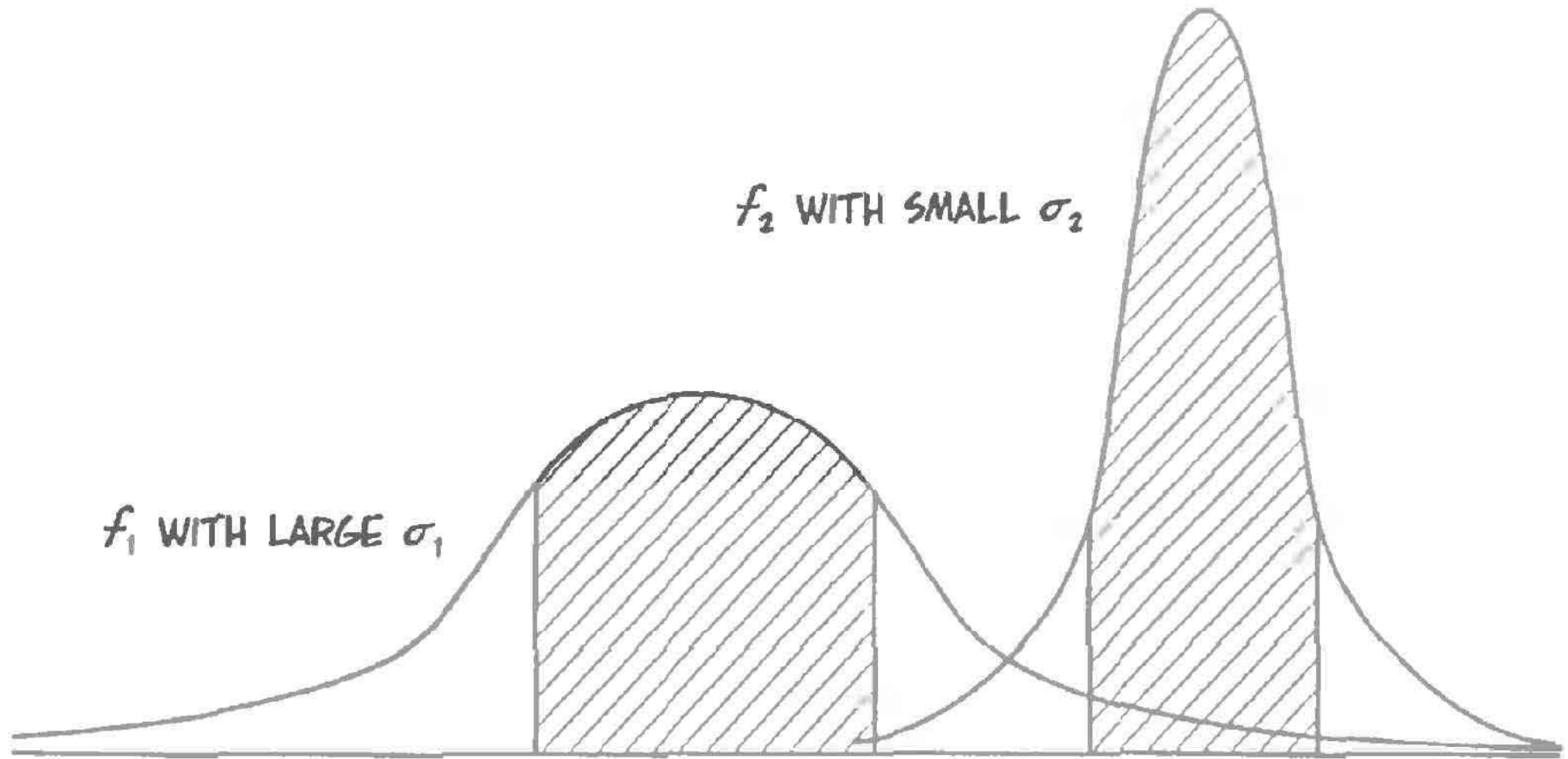


OTHER NORMALS, WITH DIFFERENT MEANS AND VARIANCES, ARE OBTAINED BY STRETCHING AND SLIDING THE STANDARD NORMAL. IN GENERAL, WE WRITE THE FORMULA

$$f(x | \mu, \sigma) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

THIS GIVES A SYMMETRIC, BELL-SHAPED DISTRIBUTION CENTERED ON THE MEAN  $\mu$  WITH THE STANDARD DEVIATION  $\sigma$ .

HERE ARE TWO DIFFERENT NORMALS WITH THE REGIONS WITHIN THEIR STANDARD DEVIATIONS SHADED.





DEPLOYING A NEWLY  
INVENTED WEAPON, THE  
*CALCULUS*, DE MOIVRE  
SHOWED THAT WHEN  $p = .5$ ,  
THE BINOMIAL DISTRIBUTION  
WAS CLOSELY  
APPROXIMATED BY A  
*CONTINUOUS DENSITY*  
FUNCTION WHICH COULD BE  
DESCRIBED VERY SIMPLY.