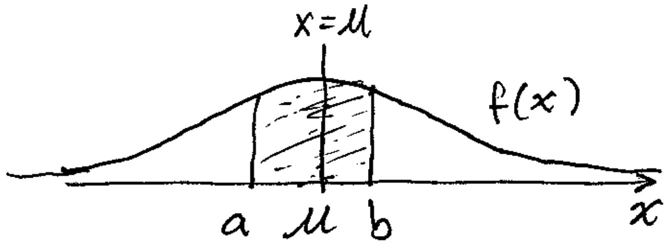
Some Normal Distribution Facts



$P(a<X<b)$ = area below $f(x)$ over $[a,b]$.

We use $P(a<X<b) = \text{normalcdf}(a, b, \mu, \sigma)$

$P(-\infty < X < \infty)$ = total area $= 1$

The graph is symmetric about $x=\mu$.

The Book: The book uses the table in the back for all normal probabilities.

If $X \sim N(\mu, \sigma)$ then $\frac{X-\mu}{\sigma} \sim N(0,1)$

$Z \sim N(0,1)$ standard notation for standard Normal.

InvNorm: Given $p = P(X < a)$

p is known but not a

then $a = \text{invNorm}(p, \mu, \sigma)$

Ex1. Scores on an exam are normally distributed with mean 72 and standard deviation 12. Find a score so that 80% of the scores are below it.

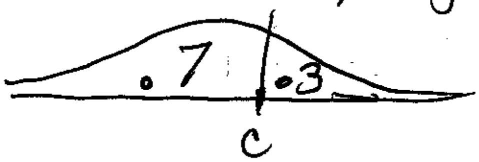
Given; $.8 = P(X < s)$ Find the score, s.

$s = \text{invNorm}(.8, \underset{\mu}{72}, \underset{\sigma}{12})$

Ex 2. Same info but find a score, c so that 30% of scores are above c.

$.3 = P(X > c)$

InvNorm must have $P(X \le c)$. That is how it is programmed in the calculator.



$1 - .3 = .7 = P(X \le c)$

$c =$ invNorm(.7, 72, 12)

Remember the total area is 1.

Approximating a Binomial Randam Variable.

If $X \sim$ Binomial(n, p) then for K, L pos. whole #'s

* $P(K \le X \le L) =$ binomcdf(n, p, L) − binomcdf$(n, p, K-1)$

is approximately

** normalcdf$(K-.5, L+.5, np, \sqrt{npq})$

This is a good estimate when np and nq are both bigger than 5.

* is the exact probability

** is the normal approximation.