

STATS 3N03/3J04

2004-10-18

14-1

TESTS 2 & 3 MAKEUP:  
FRI 9:30 AM

TEST 2:  
CHAPTERS 2, 3, 4,  
5.6, 5.7, 7.4, 7.5

A02 - ONLINE

PLEASE EMAIL ME RE  
PROBLEMS (TEXT, WEB) TO  
DO IN CLASS.

COEFFICIENT OF VARIATION

$$\text{C.O.V.} = \frac{\sigma}{\mu}$$

EXPONENTIAL DIST. 1

POISSON DIST.  $\frac{1}{\sqrt{\mu}}$

GEOMETRIC DIST.  $\frac{\sqrt{q}}{p} / \frac{1}{p} = \sqrt{q}$

LENGTH OF FISH AT  
A GIVEN AGE  $\approx 10^{-7}$

14-2

## NORMAL (GAUSSIAN) DISTRIBUTION

$$X \sim N(\mu, \sigma^2)$$

PDF

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

$$-\infty < x < \infty$$

MEAN  $\mu$ VARIANCE  $\sigma^2$ 

## STANDARD NORMAL

$$Z \sim N(0, 1)$$

PDF

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

$$-\infty < z < \infty$$

CDF

$$\Phi(z) = \int_{-\infty}^z \frac{1}{\sqrt{2\pi}} e^{-\frac{z'^2}{2}} dz'$$

- TABLES

- MOST SOFTWARE

14-3

CDF OF  $N(\mu, \sigma^2)$ 

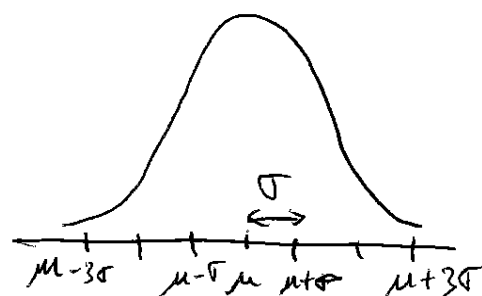
$$F(x | \mu, \sigma^2) = \int_{-\infty}^x \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\left(\frac{x'-\mu}{\sigma}\right)^2} dx'$$

$$= \int_{-\infty}^{\frac{x-\mu}{\sigma}} \frac{1}{\sqrt{2\pi}} e^{-\frac{z^2}{2}} dz$$

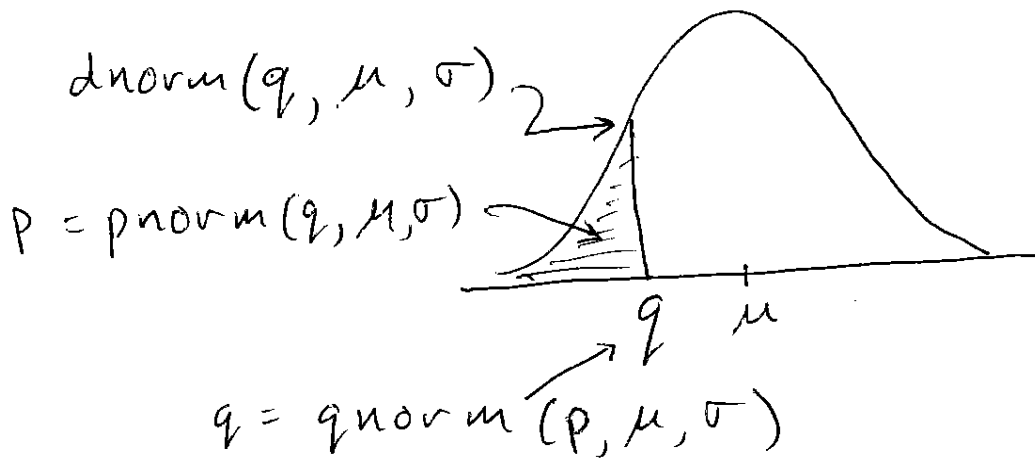
$$= \Phi\left(\frac{x-\mu}{\sigma}\right)$$

IN R :  $\text{pnorm}((x-\mu)/\text{sigma})$ OR  $\text{pnorm}(x, \mu, \text{sigma})$ 

↑ NOT VARIANCE

PLOT OF  $N(0, 1)$  PDFPLOT OF  $N(\mu, \sigma^2)$  PDF

14-4



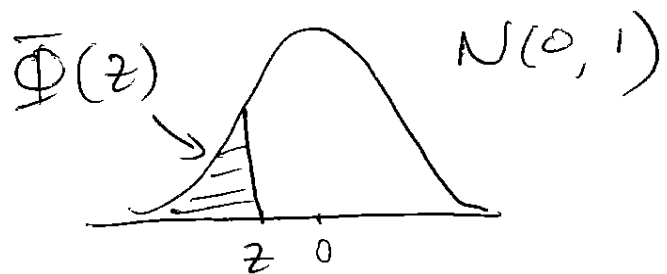
RANDOM NUMBERS  $r_{\text{norm}}(\mu, \sigma)$

$$p_{\text{norm}}(q_{\text{norm}}(.9)) = .9$$

$$d_{\text{norm}}(2, 2, 2) = \frac{1}{2\sqrt{2\pi}} = \frac{.3989}{2} \approx .2$$

TABLES - APPENDIX A

TABLE II

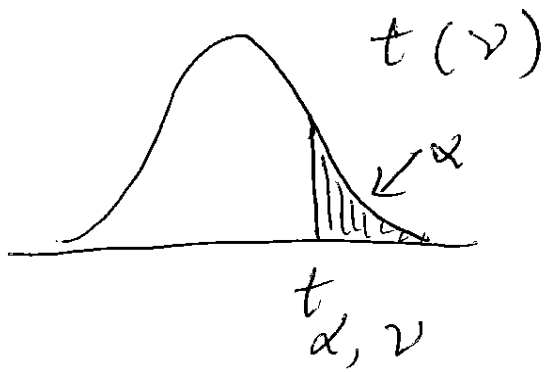


ENTER  $z$  GET  $\Phi(z)$

TABLE IV

$t$  ON  $\infty$  DF IS  $N(0, 1)$

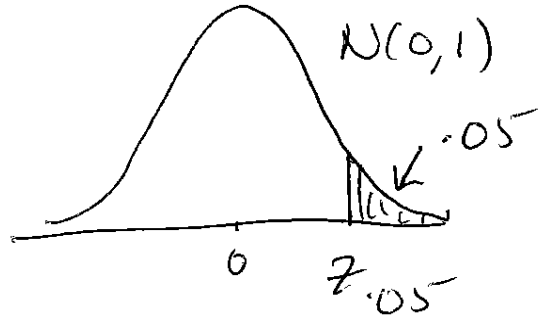
ENTER AREA, GET QUANTILE



$v =$  "DEGREES OF FREEDOM"

14-5

EX FIND  $z_{.05}$   
 $= 1.645$



NOTE:

SOMETIMES USE RIGHT TAIL,  
 SOMETIMES LEFT TAIL.

$z_{.05}$  IS 95<sup>th</sup> PERCENTILE

WHAT IS 5<sup>th</sup> PERCENTILE?

EX IQ IS SET UP TO  
 HAVE MEAN = 100 AND  
 SD = 15. WHAT PERCENTAGE  
 OF THE POPULATION  
 HAS IQ > 130?