Math 2311

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Office Hours: MW 11am to 12:45pm in 639 PGH

Online Thursdays 4-5:30pm

And by appointment

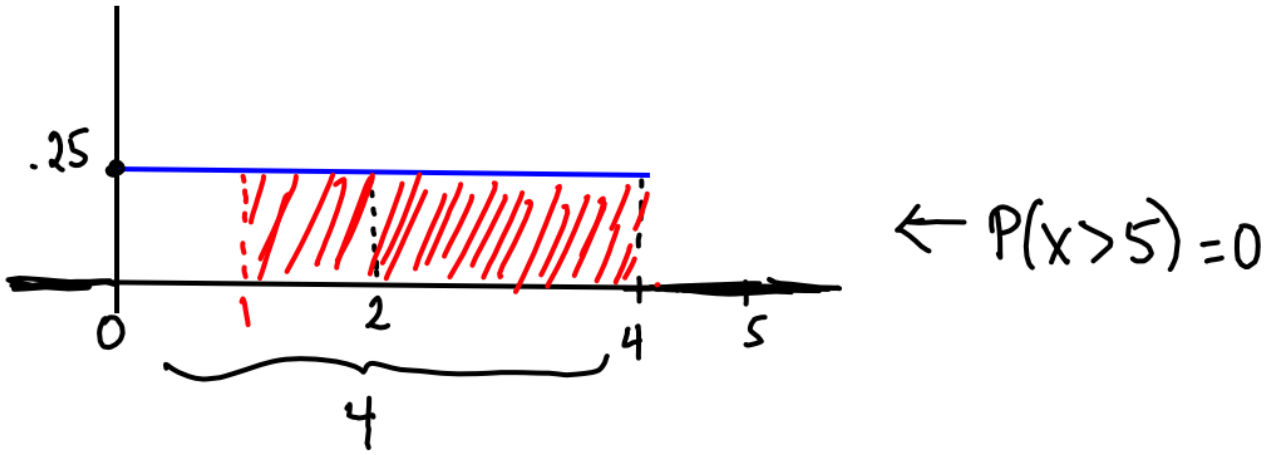
Class webpage: http://www.math.uh.edu/~bekki/Math2311.html

Popper 15

Given a uniform probability density function defined from X=0 to X=4,

1. Find P(X=2)

- **a.** 0
- **b.** .1
- **c.** .2
- **d.** .5



2. Find P(X>1)

- **a.** .25
- **b.** .75
- **c.** .1
- **d.** .5

Exam: 8 pts each = 40 pts

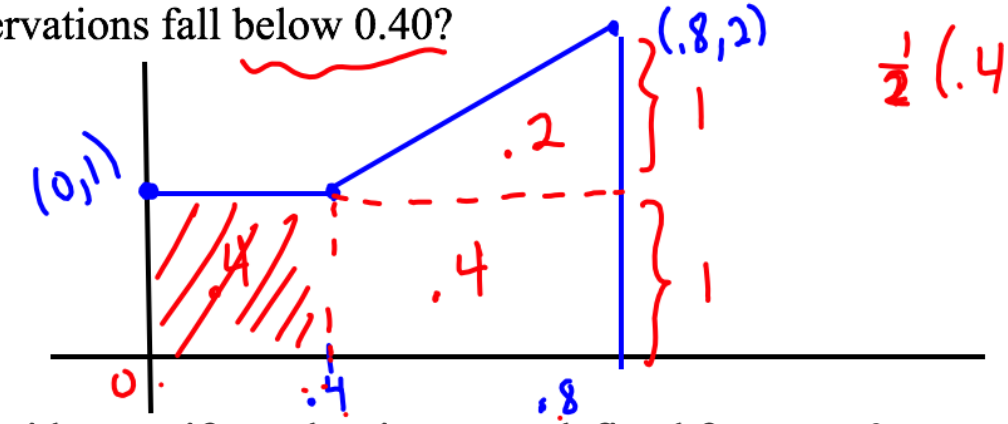
5 m/c and 3 f/r. (15, 20, 25) = 60 pts

Covers sections 4.1 – 6.3

Ch 4:

Density curves –

Think about a density curve that consists of two line segments. The first goes from the point (0, 1) to the point (0.4, 1). The second goes from (0.4, 1) to (0.8, 2) in the xy-plane. What percent of observations fall below 0.40?

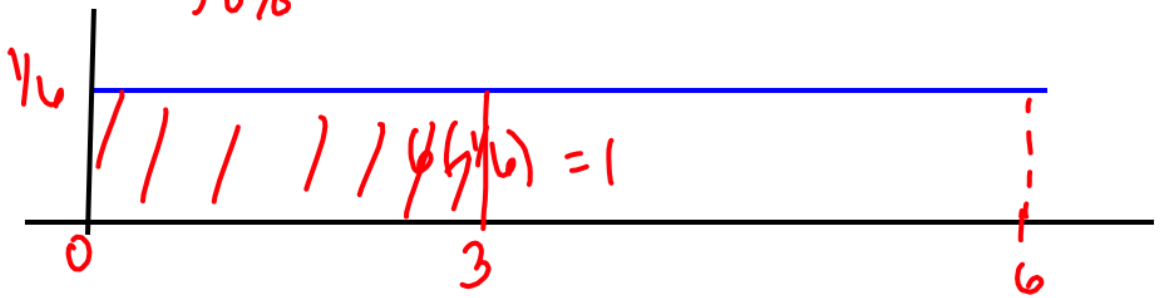


$\frac{1}{2}(.4)(1) = .2$

.4 40%

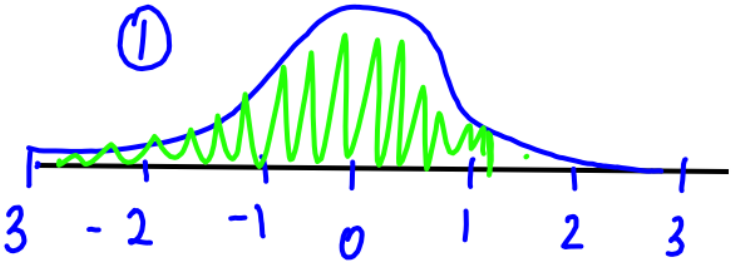
Consider a uniform density curve defined from x = 0 to x = 6. What percent of observations fall below 3?

50%



Z-Scores

Finding probabilities:



① P(Z < 1.2)

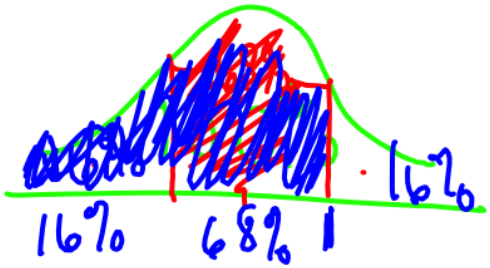
normalcdf (-999, 1.2, 0, 1)
low high μ σ

.8849

pnorm(1.2)

② P(Z >0.9)

normalcdf (.9, 9999, 0, 1) = 1 − pnorm(.9)
= .1841



③ P(-0.8 <Z < 1.1)

normalcdf(-.8, 1.1, 0, 1) = pnorm(1.1) − pnorm(-.8)
= .6522

100% − 68% = 32%

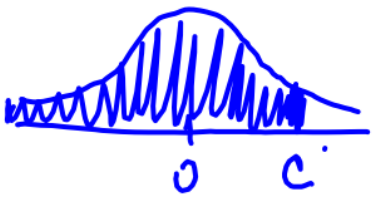
④ P(Z < c) = 0.9223, c=?

invNorm(.9223)
= 1.42

P(Z > c) = 0.6385, c=?

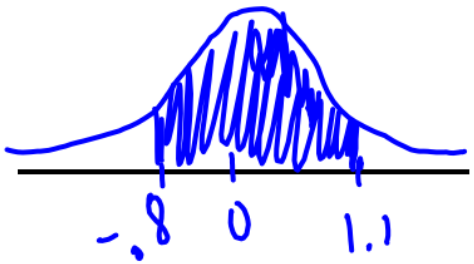
invNorm(1-.6385)
= -.354

④



②

③



P(Z < c) = .4

$P(Z < c) = \#$

invNorm(#)
gnorm(#) } answer

$P(Z > c) = \#$

Same as $P(Z < c) = 1 - c$

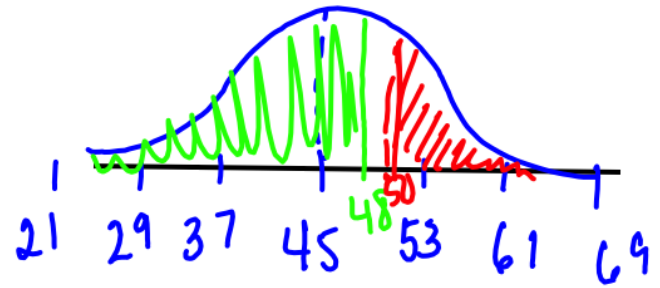
invNorm(1-#)
gnorm(1-#) } answer

X~N(45, 8) X is normally distributed w/ $\mu = 45$ $\sigma = 8$

P(X<48)

normalcdf(-99999, 48, 45, 8)

pnorm(48, 45, 8) = .646



P(X>50)

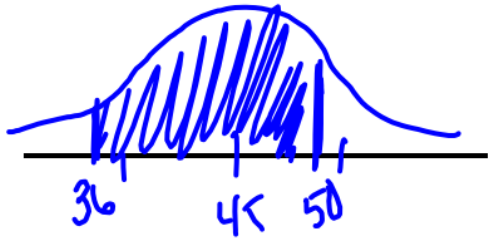
normalcdf(50, 9999, 45, 8)

1 - pnorm(50, 45, 8) = .266

P(36<X<50)

normalcdf(36, 50, 45, 8) = .6037

pnorm(50, 45, 8) - pnorm(36, 45, 8)



Find x so that P(X<x) = 0.7598

invNorm(.7598, 45, 8)

qnorm(.7598, 45, 8)

50.64

$$Z = \frac{X - \mu}{\sigma}$$

$$P(X < 48) = P\left(Z < \frac{48-45}{8}\right)$$

invNorm(.7598) = .7056 ← z

$$.7056 = \frac{X - 45}{8}$$

solve for x

$P(X < \underline{\underline{x}}) = \#$

invNorm(#, μ, σ)

$P(X > x) = \#$

invNorm(1 − #, μ, σ)

$$\mu_{\bar{x}} = \mu \qquad \sigma_{\bar{x}} = \sigma/\sqrt{n}$$

Suppose we have a random sample of 400 values with mean of 60 and variance of 4. What is mean and standard error of $\bar{X}$?

n μ $\sigma^2 \Rightarrow \sigma = 2$

$$\mu_{\bar{x}} = 60 \qquad \sigma_{\bar{x}} = 2/\sqrt{400} = .1$$

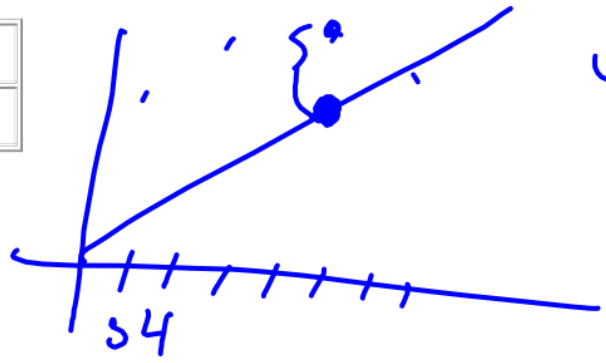
What is $P(\bar{X} > 58)$?

normalcdf(58, 99999, 60, $2/\sqrt{400}$) ≈ 1 (.999995

1 - pnorm(58, 60, .1)

Ch 5 — be able to identify explanatory + response variables

x	3	4	8	15	16	20
y	22	28	28	42	33	42



LinReg L_1, L_2, Y_1

x = c(3,4,8,.....

y = c(22,28,...

cor(x,y)

lm(y ~ x)

Correlation? $r = .8966$

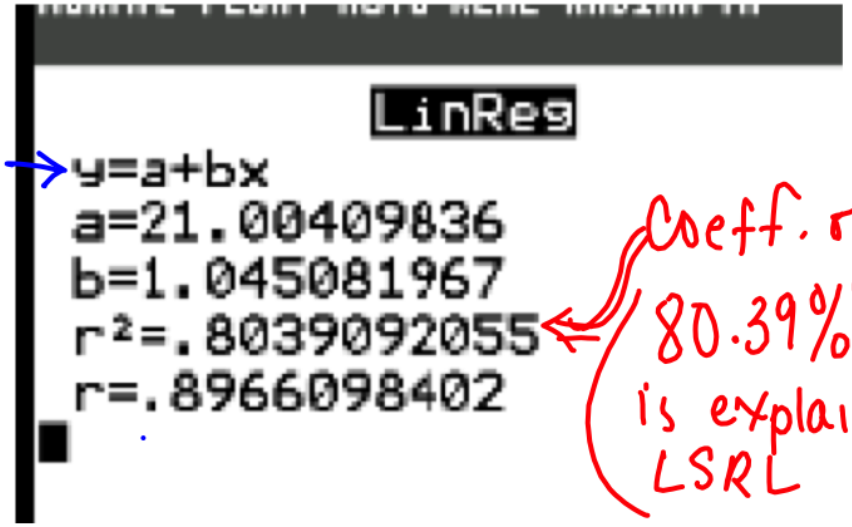
LSRL? $\hat{y} = 21.004 + 1.045x$ (1.045 = slope)

Residual for x=8? $28 - \hat{y}(8)$

-1.365

Good fit?

yes



Coeff. of determination: 80.39% of variation is explained by LSRL

Slope: for every one increase in x there is 1.045 (slope) incr or decr in y

$28 - (21.004 + 1.045(8))$

The following two-way table describes the preferences in movies and fast food restaurants for a random sample of 100 people.

	McDonald's	Taco Bell	Wendy's
Iron Man	20	12	8
Despicable Me	12	7	9
Harry Potter	6	14	12

38

28

100

What percent of the Despicable Me lovers also like McDonald's?

given

$\frac{12}{28}$

Ch 6: Simulations

treatment imposed

What is the difference between an experiment and a study?

In the Statistics classes at UH, 50% of students have an A, 20% have a B, 20% have a C, 5% have a D, and 5% have an F. What digits from the random number table would you assign to simulate asking a student what grade they had in Statistics?

00-99

01-99, 00 (100)

01-50 = A
51-70 = B
71-90 = C
91-95 = D
96-99, 00 = F

Suppose a class has 10 students. If we run a simulation, how many of our students have each letter grade? (use line 130)

130	07831	65838	52005	63845	08148	35315	13588	06969
131	03847	95382	16948	73445	10316	47927	32873	79566

Students 1 2 3 4 5 6 7 8 9 10

07 83 16 58 38 52 00 56 38 45

A C A B A B F B A A

5 A's 1 C

3 B's 1 F

Any questions from review sheet or practice test???

Popper 15

3. Find c such that $P(Z > c) = 0.7728$

a. 0
b. .1
c. [illegible] .748
d. [illegible] − .748

4. The difference between an observational study and an experiment is that a treatment is imposed on the subjects in an experiment.

a. True
b. False

5. Suppose I use line 101 from the random digit table to simulate 10 flips of a coin. I decide to let an even number represent H and odd numbers represent T. I use single digits. What is the number of heads for the 10 flips?

a. 3
b. 4
c. 5
d. 6
e. 7

Line								
101	98360	26534	47384	94612	88666	14170	10847	05567