

1st Rule of Bootcamp

NO ONE opens a folder until Hedge says so.

Consequence: 20 burpees or 60 seconds of planks. I'm not kidding.

STATISTICS



@APPROX_NORMAL
(AKA “HEDGE”)

THIS SESSION MIGHT NOT BE FOR YOU IF...



- **YOU TEACH STATS NOW**
- **YOU HATE STATS**
- **YOU'RE LOOKING FOR AN
"EPIC STATS BATTLE"**

If you're still here...

- **Remember that data is messy sometimes.**
- **With everything we do, try to think “How can I take this into my classroom to make it work?”**



STATS.

Ugh. Good god, y'all.
What is it GOOD for?

Well, absolutely A LOT.

Meet Kristen Gilbert



- Nurse
- VA hospital

Several times she was the first person to notice a patient going into cardiac arrest.... Some considered her an angel.

UNDER HER CARE:

- 4 dead patients
- 3 mysterious near-fatal heart attacks
- Shortage of the drug epinephrine, a synthetic adrenaline, that stimulates the heart

Is that enough to INVESTIGATE her?

Things I discuss w/ students

Reports from Other Nurses:

Nurse Kathy Rix

suspecting something was wrong, counted the epinephrine bottles one afternoon. There were three. Then there was a cardiac emergency, and when she went back to see if the bottles were still there, she found none, but there were three broken containers in the needle disposal bucket.

Another nurse (anonymous)

said that she'd heard the first man who'd died cry out, "Stop! Stop! You're killing me!" At the time, Gilbert was in his room.

Bonnie Bledsoe

claimed that Gilbert had offered her some adrenaline when she said she suffered from asthma. Gilbert pulled it right out of her pocket.

THINK LIKE A COP:

⦿ Did she have MOTIVE?

- Could she be seeking the excitement of the Code Blue process, plus the added benefit of impressing her boyfriend (a security guard at the hospital)?

⦿ Did she have ACCESS?

- As a nurse, Ms. Gilbert had access to the epinephrine, even though no one had seen her administer the fatal injections.

THE KEY QUESTION:

Were there significantly more deaths in the unit when Kristen Gilbert was on duty than at other times?

With your Research Team, discuss what it would take to convince you... what does “significantly more” mean to you?

The foundation of STATS:

In Statistics, we...

- Gather Data and LOOK at it
- Use Probability to determine whether an observed outcome is likely to have occurred naturally
- Draw a conclusion based on our data and analysis

The FIRST Rule of Statistics:
(are you ready for it?)

Make
a
Picture

TMC peeps:

Open Evidence
Package "A"

What do you notice?

What do you wonder?

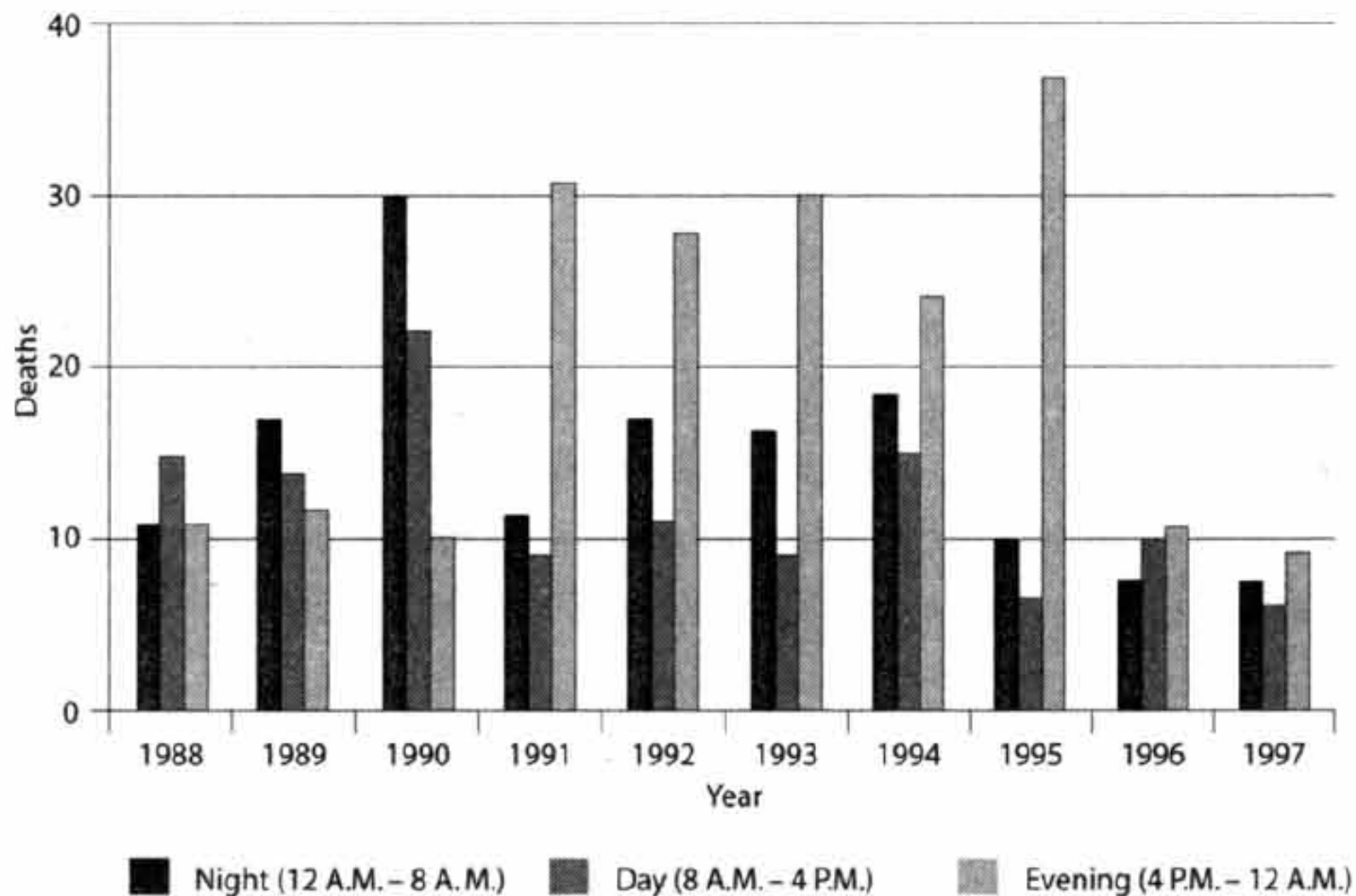


Figure 1. Total deaths at the hospital, by shift and year.

**TMC peeps:
Open Evidence
Package “B” and
follow the instructions.**

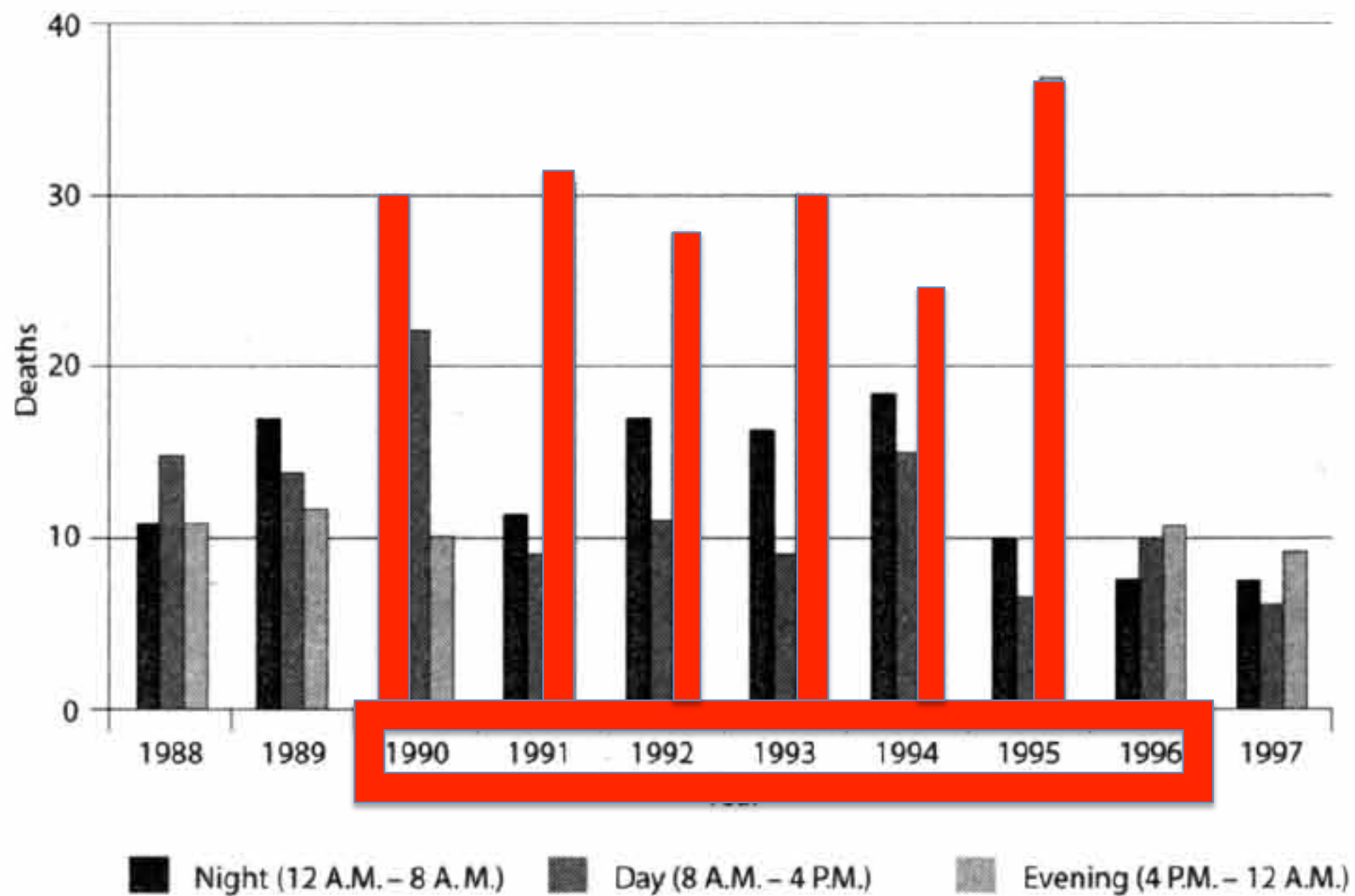


Figure 1. Total deaths at the hospital, by shift and year.

This wasn't enough
evidence to convict.

**TMC peeps:
Open Evidence
Package “C” and follow
the instructions.**

GILBERT PRESENT	DEATH ON SHIFT		
	YES	NO	TOTAL
YES	40	217	257
NO	34	1,350	1,384
TOTAL	74	1,567	1,641

We can calculate how rare this is using hypothesis tests.

The probability of having 40 or more of the 74 deaths occur on Ms. Gilbert's shifts is **less than 1 in 100 million!**

In other words, it is unlikely that Ms. Gilbert's shifts were merely "unlucky" for the patients!!

The image features a background of a camouflage pattern in shades of green, yellow, and black. In the center, there is a solid green rectangle with a thin blue border. Inside this rectangle, the text "Isn't 'average' good enough?" is written in a black, sans-serif font.

Isn't "average" good enough?

Student A: 55, 56, 57, 58, 59, 60, 60, 60, 61, 62, 63, 64, 65

Mean: _____ Median: _____ Mode: _____

Student B: 35, 40, 45, 50, 55, 60, 60, 60, 65, 70, 75, 80, 85

Mean: _____ Median: _____ Mode: _____

First Rule – Make a Picture

Student A: 55, 56, 57, 58, 59, 60, 60, 60, 61, 62, 63, 64, 65

Student B: 35, 40, 45, 50, 55, 60, 60, 60, 65, 70, 75, 80, 85

What do you notice?

Spread 'em

STANDARD DEVIATION CONCEPT CHART

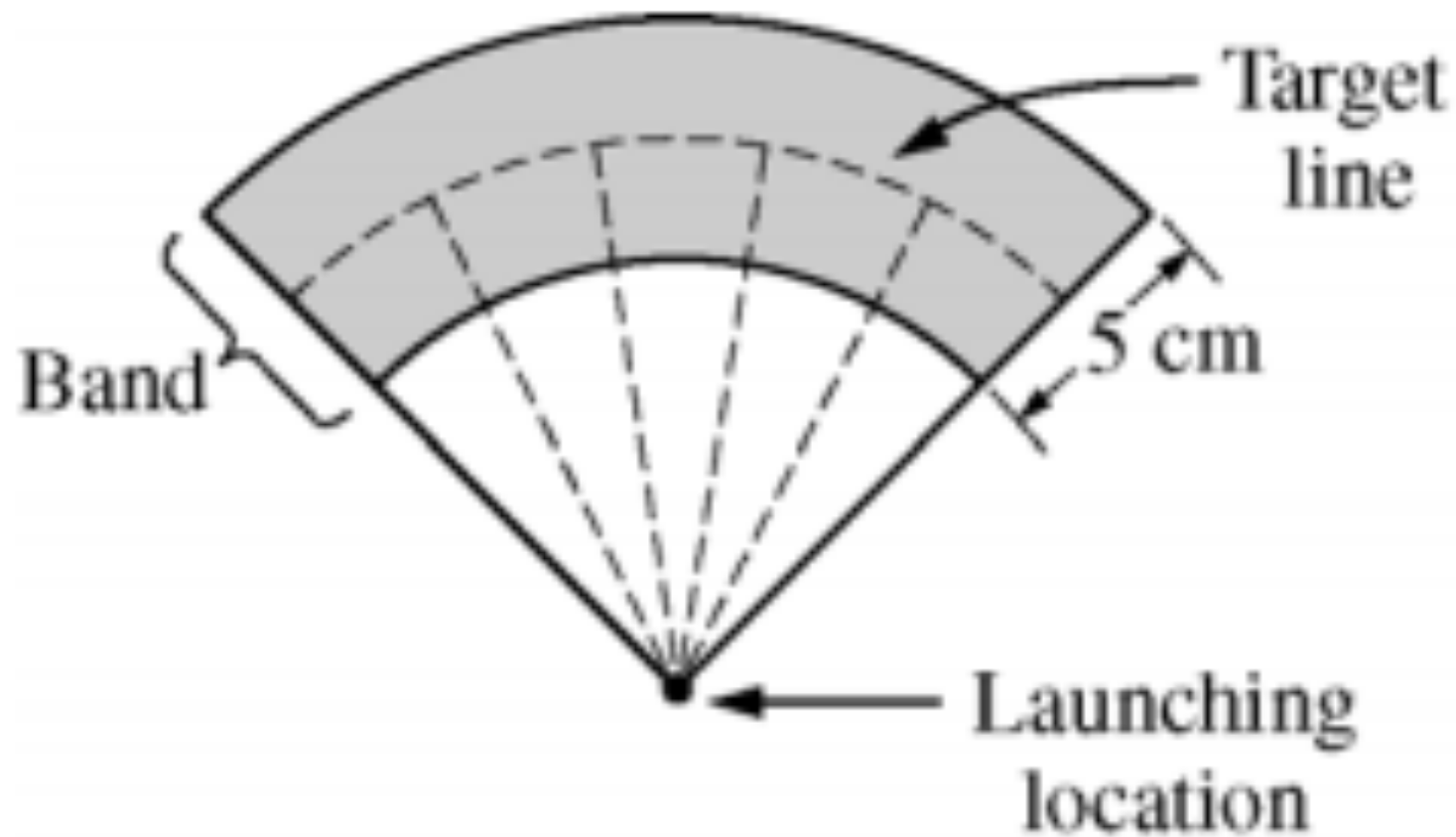
These data sets have small* standard deviations	What do you notice about the data sets?	Create two data sets with small standard deviations.
<i>2, 3, 3, 4, 5, 5, 6</i> <i>80, 82, 82, 84, 86, 88, 89, 90</i> <i>113, 114, 117, 118, 118, 119</i>		
These data sets have large* standard deviations	What do you notice about the data sets?	Create two data sets with large standard deviations.
<i>2, 22, 32, 45, 80</i> <i>42, 68, 79, 85, 102</i> <i>110, 225, 375, 560, 1002</i>		
Each of these data sets has a standard deviation of zero	What do you notice about the data sets?	Create two data sets with standard deviations of zero.
<i>2, 2, 2, 2, 2, 2, 2</i> <i>85, 85, 85, 85, 85, 85</i> <i>121, 121, 121, 121, 121, 121</i>		

*relative

Which is the Best Athlete?

Competitor	Event		
	100 m Dash	Shot Put	Long Jump
A	10.1 sec	66'	26'
B	9.9 sec	60'	27'
C	10.3 sec	63'	27'3"
Mean	10 sec	60'	26'
St Dev	0.2 sec	3'	6"

CARNIVAL CATAPULTS

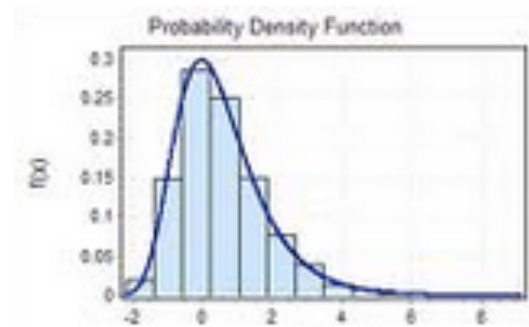
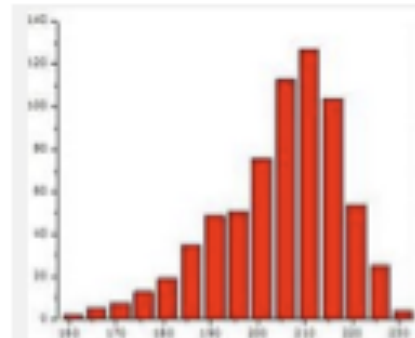
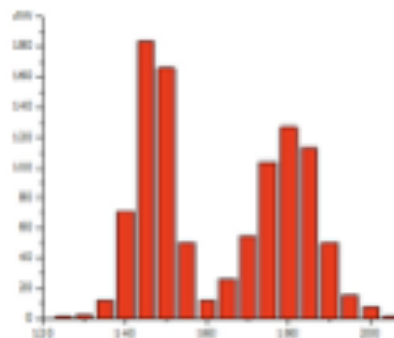




Distributions (a.k.a. “My humps”)

SHAPE SHIFTERS

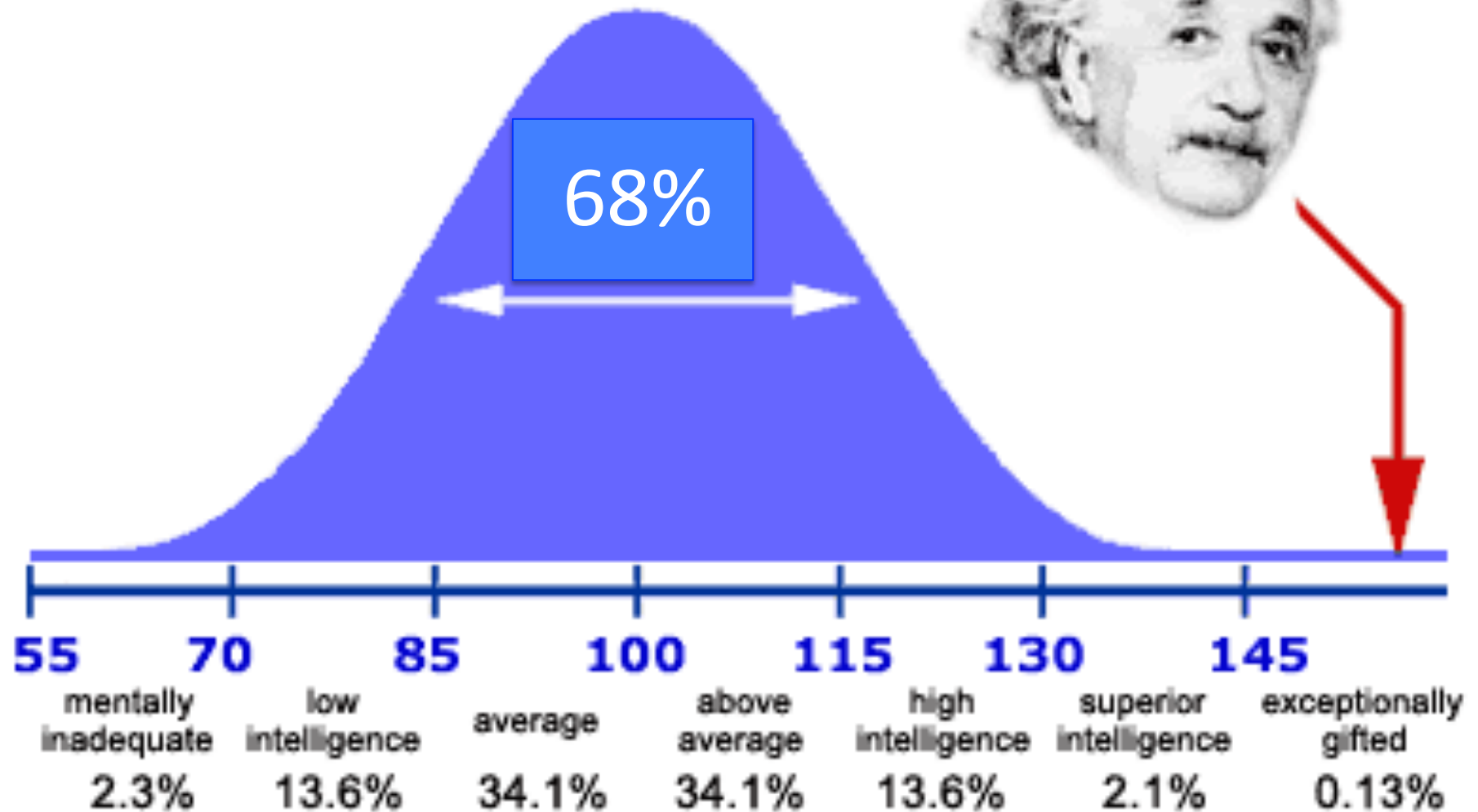
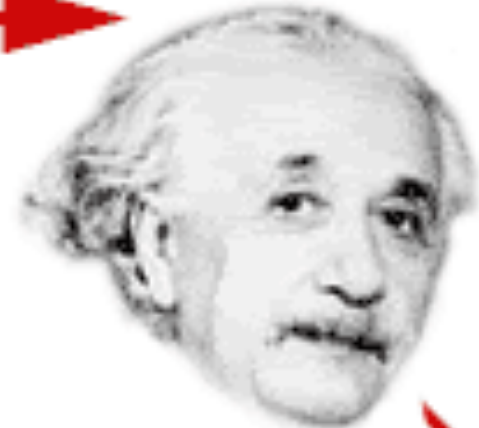
Cut out the shapes below and group them by shape.
Discuss with your group the qualifications for each group.



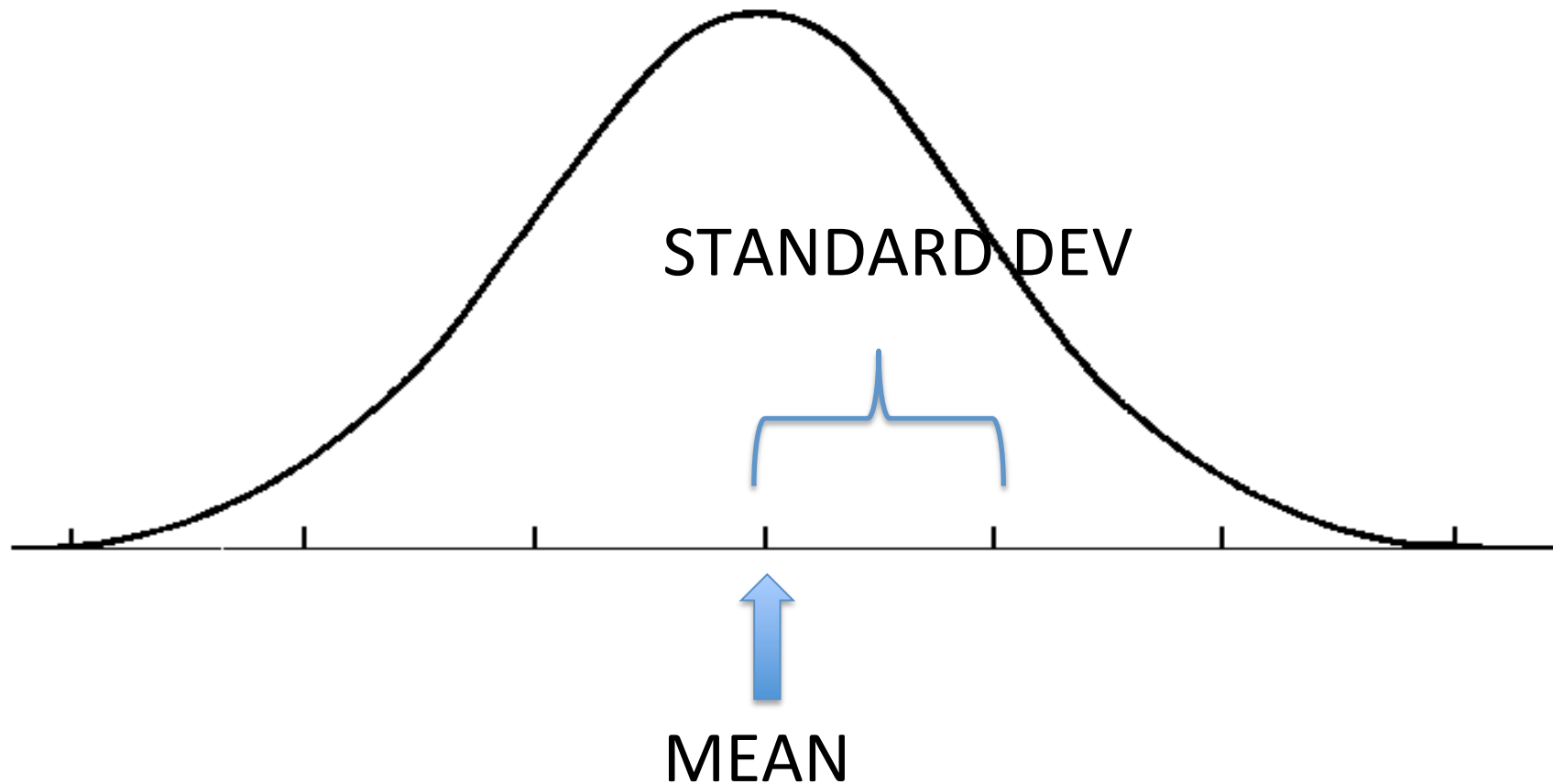


Who needs “normal” anyway?

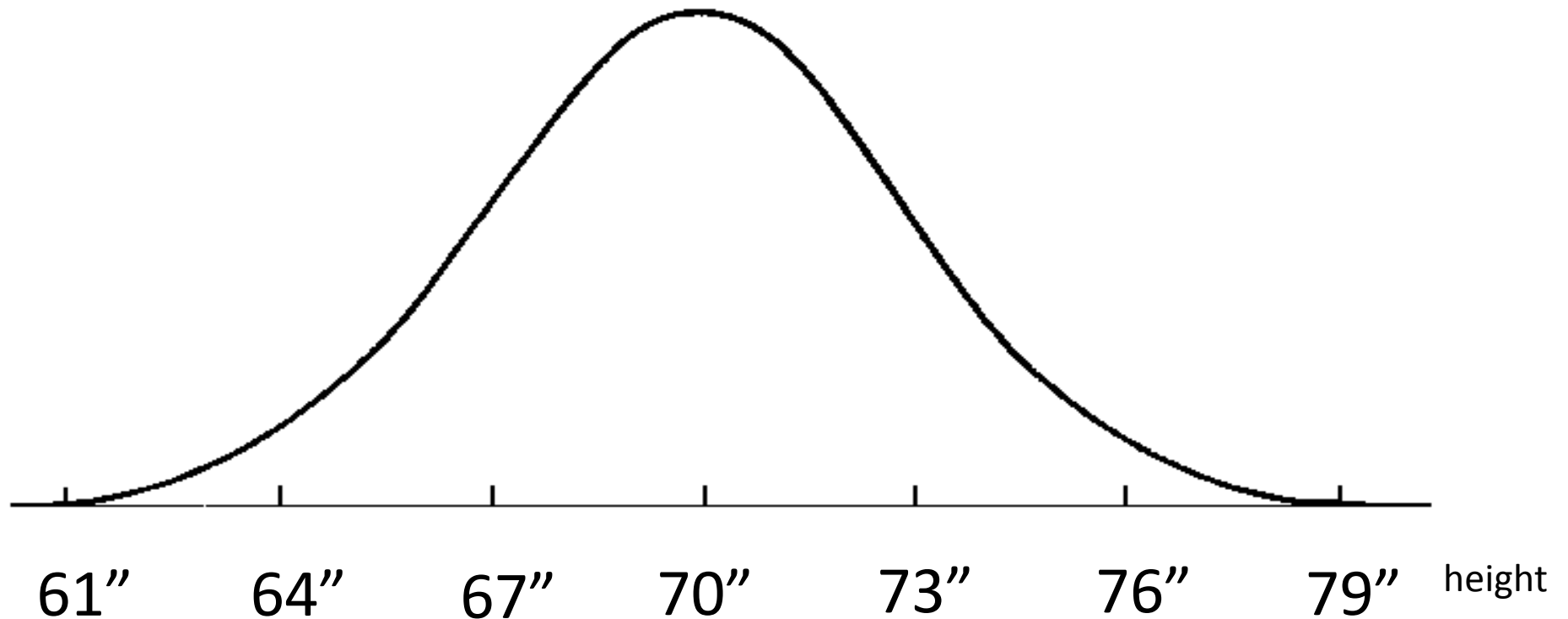
Einstein's IQ = 160+
What about yours ?



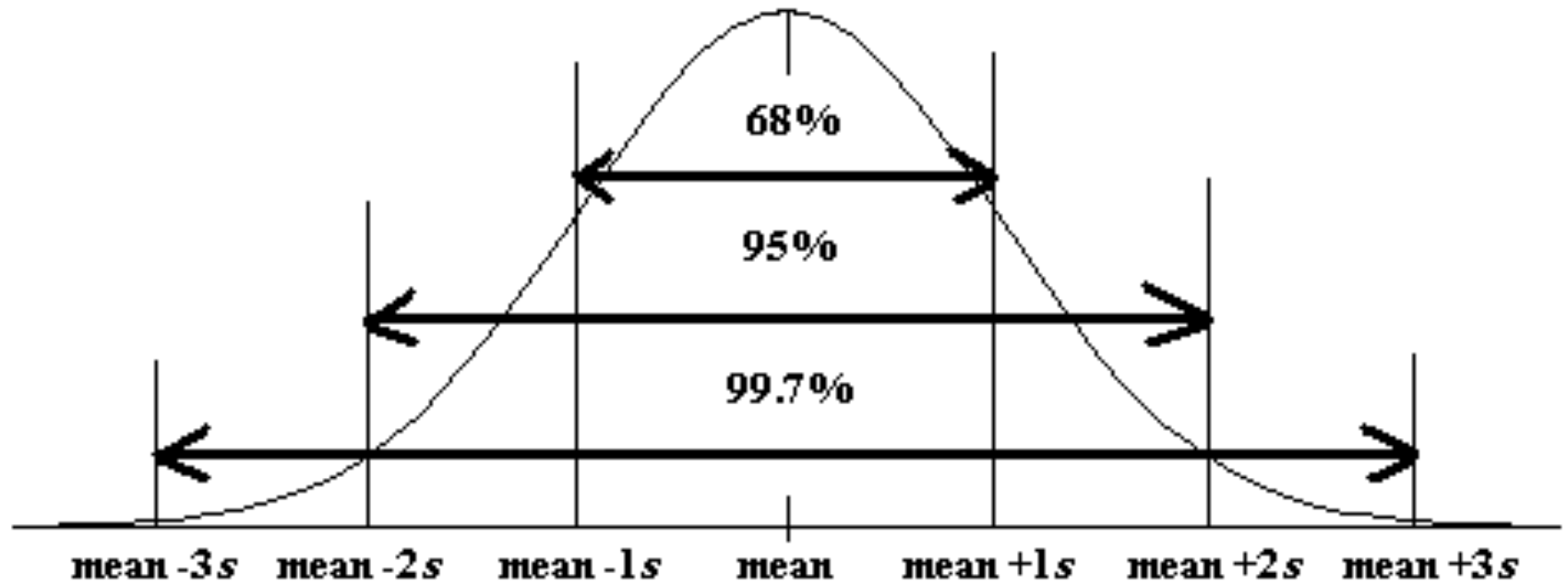
Well, this is normal:



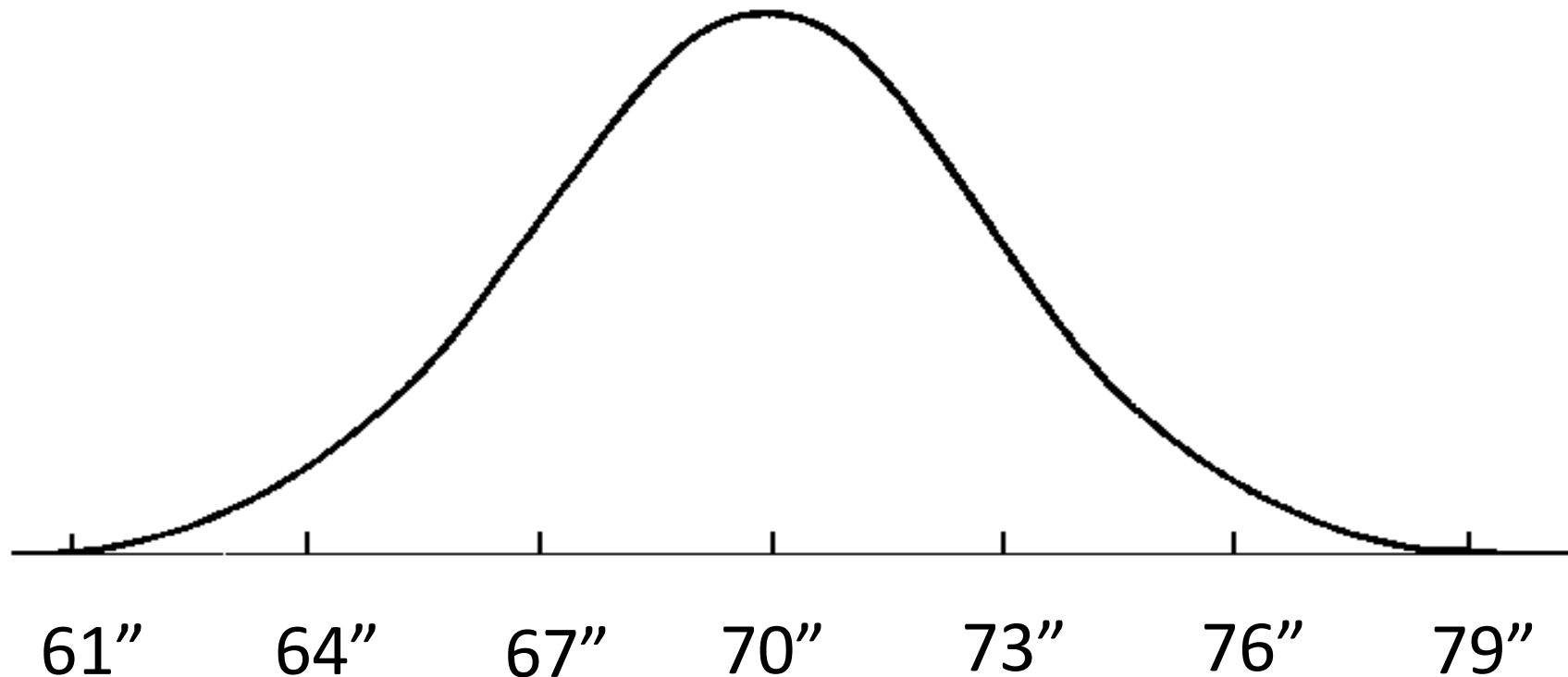
Males have a mean height of 70" w/ a standard deviation of 3"



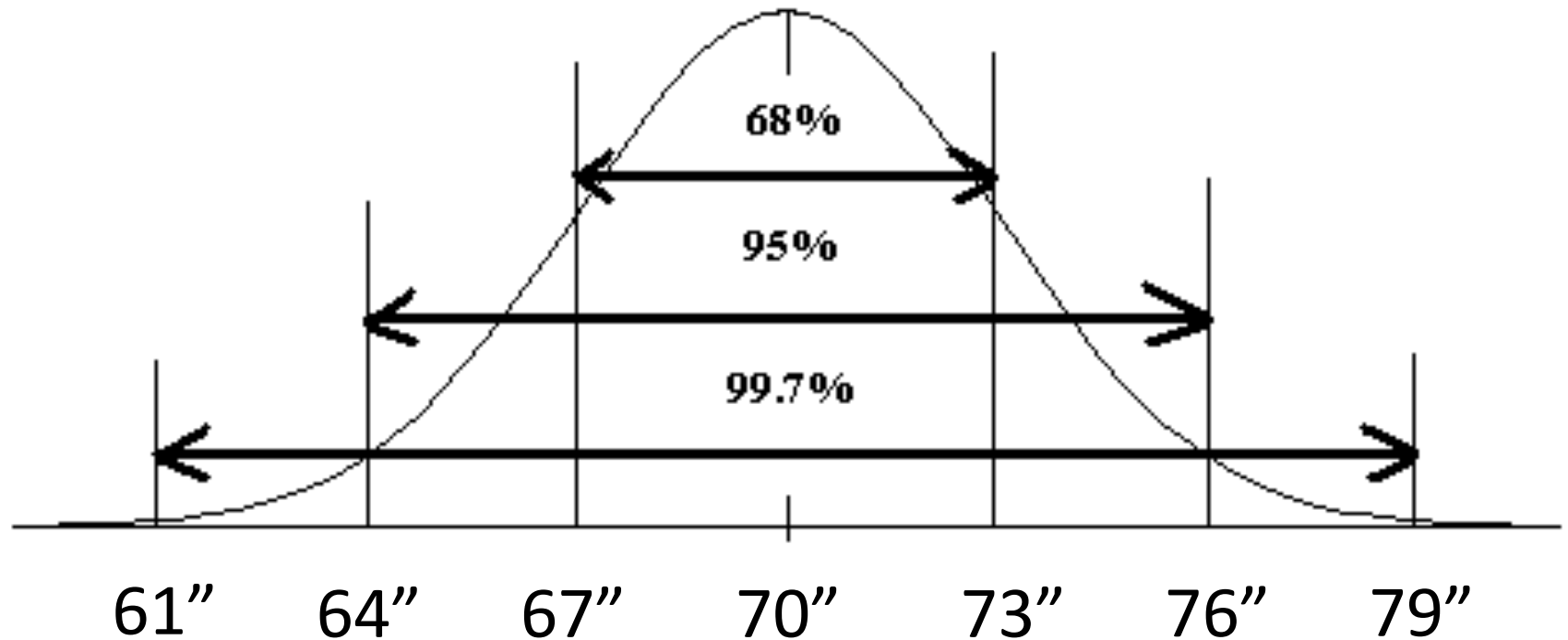
68-95-99.7 Rule



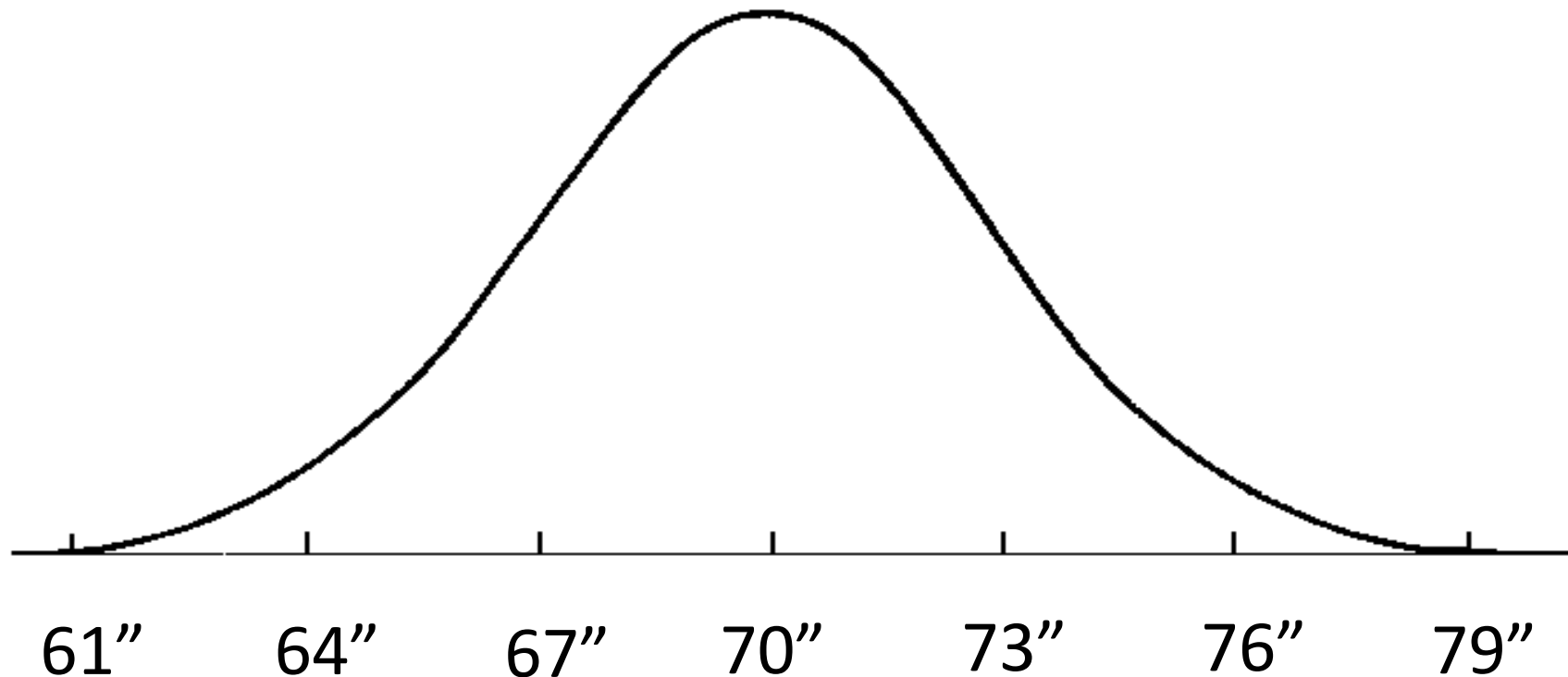
Where is @ddmeyer (79")?
How many standard deviations
above "normal"?




So what's the probability that you'll find someone taller than Dan?



People assume that “Cptn Bad Idea” is a guy. If so, where would I be?



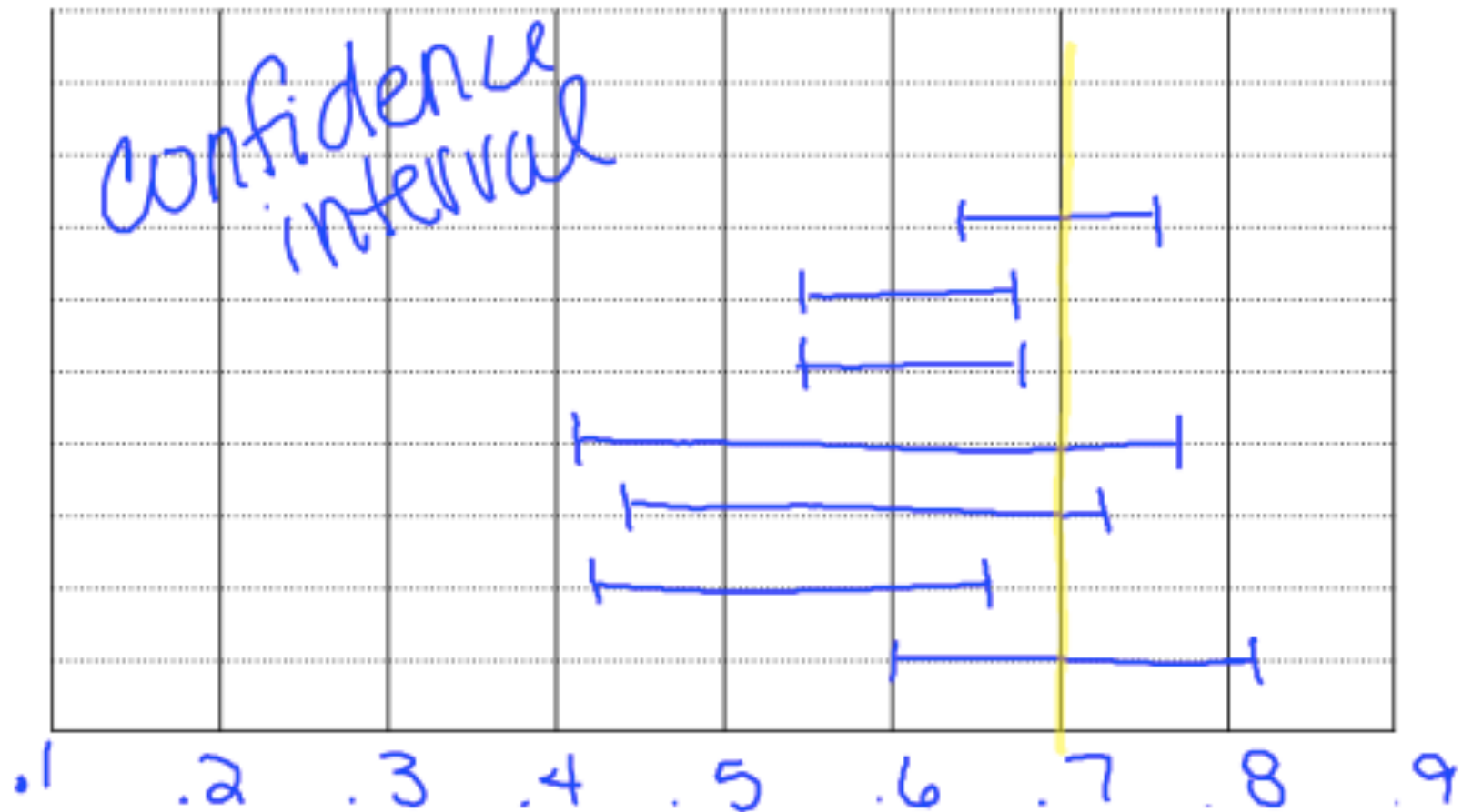


water
water
everywhere

Globe Toss

- I need 4 groups – in each group, there will be “tossers” and one recorder.
- Tossers will toss the globe – when you catch it, look under the center of your left index finger. Call out if it was on water or land.
- Recorder will tally the results.
- You can switch roles if you get bored.
- Toss the globes n times.

What's it look like?



Margin of error

Should the U.S. Government Stop Helping Fund National Public Radio?

	Yes	No
Total	39%	45%
Democrats	25%	58%
Republicans	54%	28%
Independents	38%	49%

Poll Position survey conducted Oct. 25, 2010
1,074 registered voters nationwide, margin of error $\pm 3\%$



Other Stats Stuff I Love





Stretchable Flying Frogs

IN-12/2031

★★★★☆ 3.9 / 5 ⓘ

[Read all reviews](#)

[Write a review](#)

Stretchable Flying Frogs. Loop one of these 3 1/2" stretch it back, release it and watch it fly! Kids love them in party bags at birthday parties or give them to campers.

\$3.75 Per Dozen



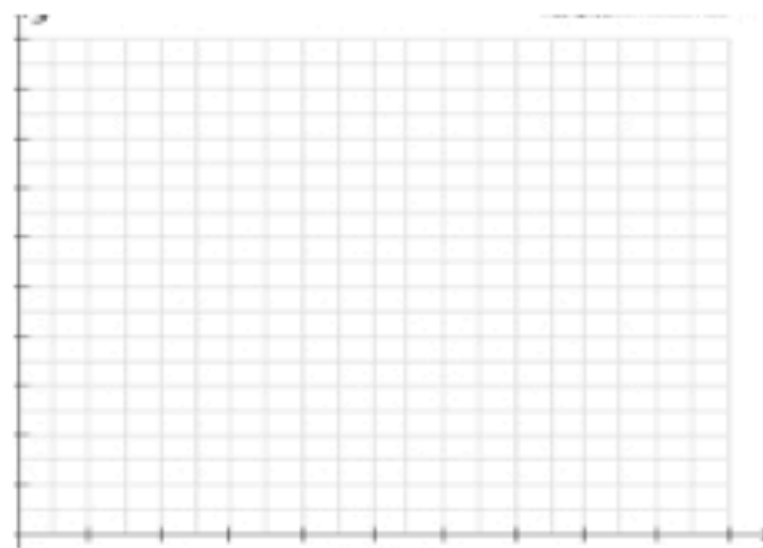
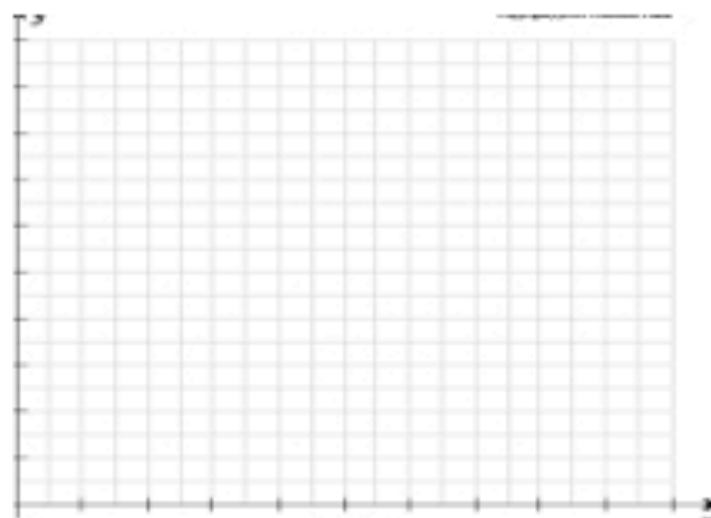
Horsepower



mass (x) vs horsepower (y)

time (x) vs horsepower (y)

1. Make a scatterplot of the class data.



2. Find the correlation coefficient and write what it means in context.

3. Find the linear regression equation and interpret the slope and y-intercept in context.

Data

What was your horsepower?	What was your shortest "frog flipping" distance (IN YARDS)?	What was your longest "frog flipping" distance (IN YARDS)?	What is your height IN INCHES?	don't try and be funny - this is important for data collection)
1.12	9 yds	14.9 yds	64 inches	male
0.84	8	11	67	female
0.59	6 yards	10 yards	62 inches	female
0.65	9	14	68.5	female
1.65 hp	9 yards	15 yards	68 inches	male
0.67	9 yards	13 yards	64 inches	female
1.88	7	12	62	female
0.74	7	15	68	female
0.691	8 yards	9.5 yards	68 inches	female
3.03	9	15	74 inches	male
1.02	7	18	65	male
2.4	14	19	72in.	male
0.775	7 yards	10 yards	5'4	female
1.53	1	12	70 inches	male
0.75	5	16	65	female
5.45	8	15	73	male







THANKS!