

## Prep for Test # 1

Take the test in class only. Bring your calculator. No Textbook.

### Covers Chapters, Sections:

- 1.1-1.2 Nature of Statistics
- 2.1-2.5 Sampling, Organizing Data  
Freq table, histogram, etc.
- 3.1-3.2, Mean, median, Standard Dev, etc.
- 3.4 5 Number Sum, Boxplots, IQR, etc
- 3.5 sample vs population, z-scores
- 4.1-4.3 Probability Basics, Rules
- 6.1-6.3 Normal Distribution  
Areas, probabilities, shapes

*not a complete list, includes all topics covered in class*



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## Test Format

Part I: choice of 4 of 5 problems  
(40pts @ 10 pts)

Part II: choice of 3 of 4 problems  
(60pts @ 20 pts)

Problems need to be completed using  
the same methods that we use in class.

Partial credit will be assigned for all problems.



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## 1. Review Homework

Look especially at the more complex problems from each section.

## 2. Review Class Notes

- a) Check first page: Do you know each topic?
- b) Redo the sections needed.

## 3. Review Videos

## 4. Review Quizzes

Contain simpler problems, so treat them as a minimum of the information you should know.

## 5. ReDo all Practice Quizzes

Each practice quiz has more problems than you see in one try, so some of the questions will be new.

## 6. Study in Groups with Other Students

Talking about math helps you to think more clearly about it and to remember it.

## Prep for Test # 1

Have your calculator.

Know how to use it.

Check the batteries beforehand.

The test is only given in class on the day of the test. There will be no make-ups. If you miss the test, your grade for the test will be 0 and you will need to do a project to replace the grade.

## REVIEW TOPICS

**3.5 z-score** is the number of standard deviations away from the mean of a particular  $x$  value.

Each data item has a z-score.

$$z = \frac{x - \mu}{\sigma}$$

population

$$z = \frac{x - \bar{x}}{s}$$

sample

distance of  $x$  from the mean  
standard deviation



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**z-score** is the number of standard deviations away from the mean of a particular  $x$  value. Each data item has a z-score.

$$G: x = 82, \quad \bar{x} = 75, \quad s = 10$$

$$F: z$$

---

$$G: x = 69, \quad \bar{x} = 75, \quad s = 10$$

$$F: z$$



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$$G: x = 82, \quad \bar{x} = 75, \quad s = 10$$

$$F: z$$

$$z = \frac{x - \bar{x}}{s} = \frac{82 - 75}{10} = \frac{7}{10} = 0.7$$

---

$$G: x = 69, \quad \bar{x} = 75, \quad s = 10$$

$$F: z$$

$$z = \frac{x - \bar{x}}{s} = \frac{69 - 75}{10} = \frac{-6}{10} = -0.6$$

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True or False:

Two data sets that have the same frequency distribution have the same relative frequency distribution.

True or False:

Two data sets that have the same relative frequency distribution have the same frequency distribution.



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True or False:

Two data sets that have the same frequency distribution have the same relative frequency distribution.

True or False:

Two data sets that have the same relative frequency distribution have the same frequency distribution. *same*

DATA SET 1

| CLASS | f  | rel.f |
|-------|----|-------|
| A     | 2  | 0.10  |
| B     | 4  | 0.20  |
| C     | 6  | 0.30  |
| D     | 8  | 0.40  |
| Total | 20 |       |

DATA SET 2

| CLASS | f  | rel. f |
|-------|----|--------|
| A     | 4  | 0.10   |
| B     | 8  | 0.20   |
| C     | 12 | 0.30   |
| D     | 16 | 0.40   |
| Total | 40 |        |

*different*

G: 24, 25, 33, 53, 30

F: s

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

Use the formula to set up the table



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G: 24, 25, 33, 53, 30

F: s

| x          | <sup>x-33</sup><br>x- $\bar{x}$ | $(x-\bar{x})^2$ |
|------------|---------------------------------|-----------------|
| 24         | -9                              | 81              |
| 25         | -8                              | 64              |
| 33         | 0                               | 0               |
| 53         | 20                              | 400             |
| 30         | -3                              | 9               |
| <u>165</u> |                                 | <u>554</u>      |

165/5=33.0

$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$

$s = \sqrt{\frac{554}{4}} = 11.76$

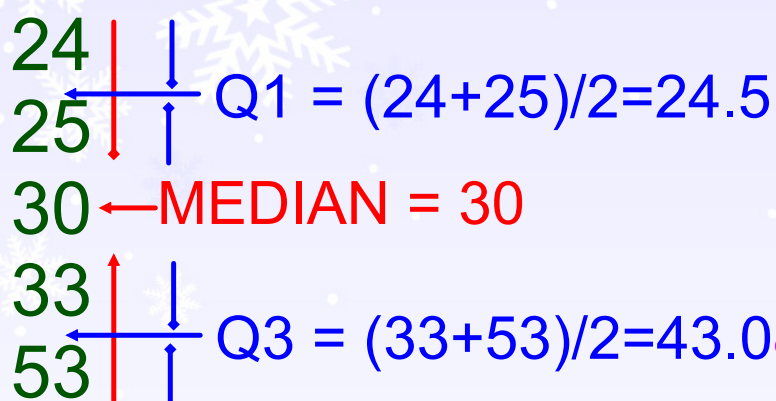
$\Sigma = \_\_ + \_\_ + \_\_ + \_\_$

$\Sigma$  is an operator: "add these"

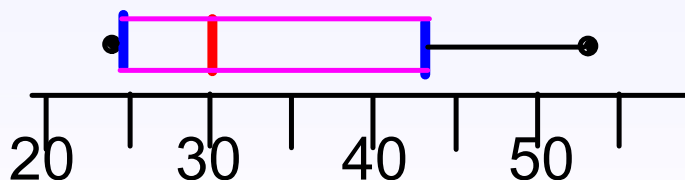


F: Median, Q1, Q3, IQR

33, 25, 24, 53, 30



IQR =  $Q3 - Q1$   
 $= 43.0 - 24.5$   
 $= 18.5$   
 Middle 50% is 18.5 units long



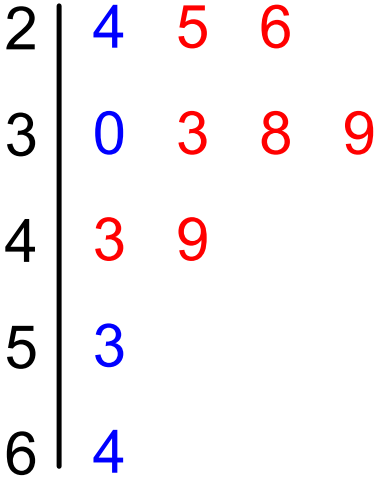
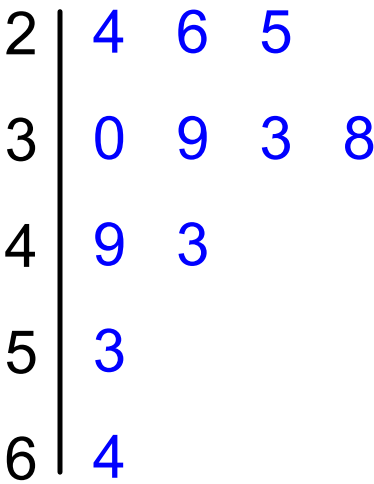
Five Number Sum: 24 24.5 30 43.0 53  
 (not asked for)

F: Stem & Leaf Diagram

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 24 | 39 | 64 | 53 | 26 | 25 |
| 30 | 33 | 49 | 43 | 38 |    |

F: Stem & Leaf Diagram

24    39    64    53    26    25  
30    33    49    43    38



What kind of variable is each of the following?

Subaru Outback

height

hair color

Bald Eagle counts

miles to school

time to take a test

WCC main campus

gps coordinates



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What kind of variable is each of the following?

|                     |                         |
|---------------------|-------------------------|
| Subaru Outback      | qualitative             |
| height              | quantitative continuous |
| hair color          | qualitative             |
| Bald Eagle counts   | quantitative discrete   |
| miles to school     | quantitative continuous |
| time to take a test | quantitative continuous |
| WCC main campus     | qualitative             |
| gps coordinates     | quantitative continuous |



## 4.1 Probability Basics

## Basic Properties of Probability

1.  $0 \leq p \leq 1$

2. If event can NOT happen,

$$p = 0$$

If a bowl contains brown and red M&Ms, find the probability that you select a blue M&M.

3. If event MUST happen,

$$p = 1$$

At an all girls school, find the probability that a student selected at random is female.

## General Addition Rule:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \& B)$$

If events **A** and **B** are mutually exclusive,  $P(A \& B) = 0$  and

$$P(A \text{ or } B) = P(A) + P(B)$$

Complementation Rule:  $P(E) = 1 - P(\text{not } E)$

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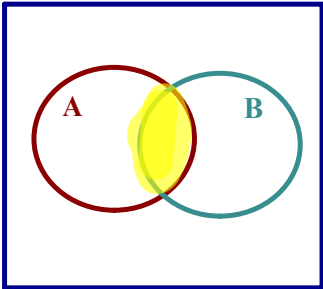
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4.2 Events

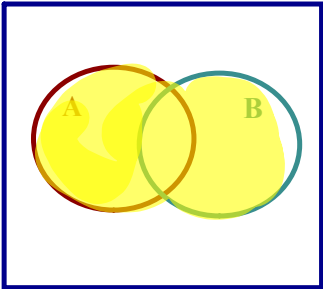
Let  
A: live in Westchester  
B: own a car

R: live in Rockland

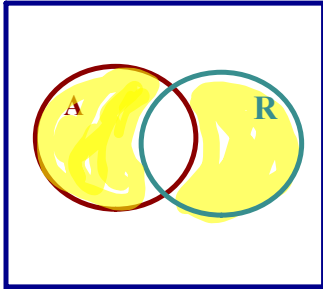
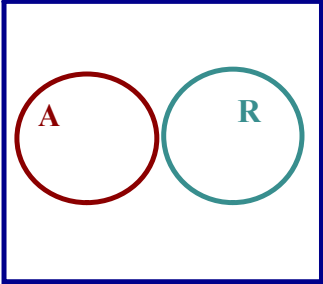
Shade (A & B)  
in both A and B




Shade (A or B)  
in either A or B or both





Mutually Exclusive:  
no common outcome(s)

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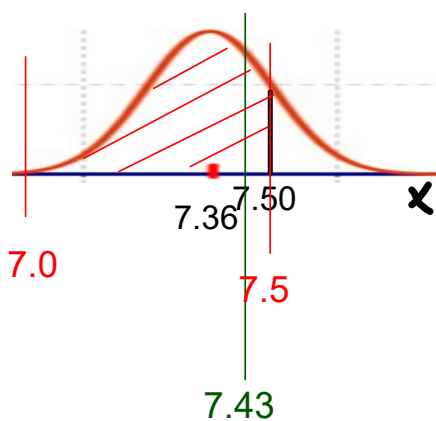
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 [Class Notes](#)

 [Homework](#)

6.101 Arterial Cord pH. Based on a recent study, the pH level of the arterial cord (one vessel in the umbilical cord) is normally distributed with mean 7.36 and standard deviation of 0.14. Find the percentage of preterm infants who have the following arterial cord pH levels.

- a. pH levels between 7.00 and 7.50. b. pH levels over 7.44  
c. Find the 70th percentile



a)  $3(0.14) = 0.42$ ;  $7.36 - 0.42 = 6.94$

so 7 is almost 3 stdev to left

$\text{normalcdf}(7.0, 7.5, 7.36, 0.14) = 0.8363$ ; **83.6%**

b)  $\text{normalcdf}(7.44, 9, 7.36, 0.14) = 0.2839$ ; **28.4%**

c)  $\text{invNorm}(0.700, 7.36, 0.14) = 7.43$ ;  
**the 70th percentile of arterial chord pH is 7.43.**