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11.1 Statistical Questions and Variables

Statistical Question can be answered by collecting many pieces of information or data and summarizing the data.

Statistical Variable - can be measured or counted
Categorical Variable - data that fall into categories

quantitative variable - you could meaningfully count

Population - All member of a group
Sample - subset (part of) a group

Parameter - measure that describes a Population
Statistic - measure that describes a Sample

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11.2 Statistical Studies

3 Types of Study

1. Sample survey
2. Experiment
3. Observational

bias- produces results that misrepresent a population

simple random sample- each member of the population is equally likely to be chosen

* pg 560 concept box important *
Go over with class

Talk through example 3 pg 561

Experiment group- receives the treatment
Control group- does not receive the treatment

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11.3 Data Distributions

ex] Find the mean and standard deviation
5, 9, 7, 8, 5, 12, 14, 5, 7, 10

Sci Calc.

1. 2nd data (stat)
2. 1-Var
3. Data, input numbers
4. stat Var
   $\bar{x}$ = mean
   s_x = standard deviation
   $\bar{x} = 8.2$
   $s_x =$

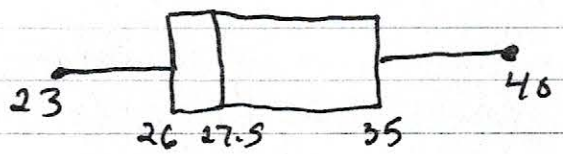
Five Number Summary

min
Q_1 - middle of the lower half
Q_2 - median
Q_3 - middle of the upper half
max

ex] 23, 25, 27, 27 | 28, 30, 40, 40 (Q_2)

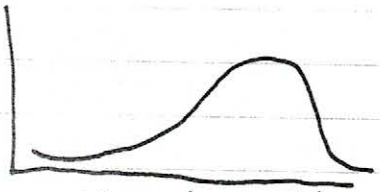
min = 23
$Q_1 = 26$
$Q_2 = 27.5$
$Q_3 = 35$
max = 40

b) Draw box and whisker Plot

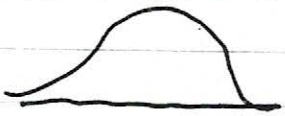


over →

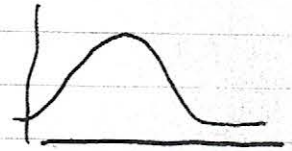
Skewed Distributions



Skewed Left



symmetric
Normal
Distribution



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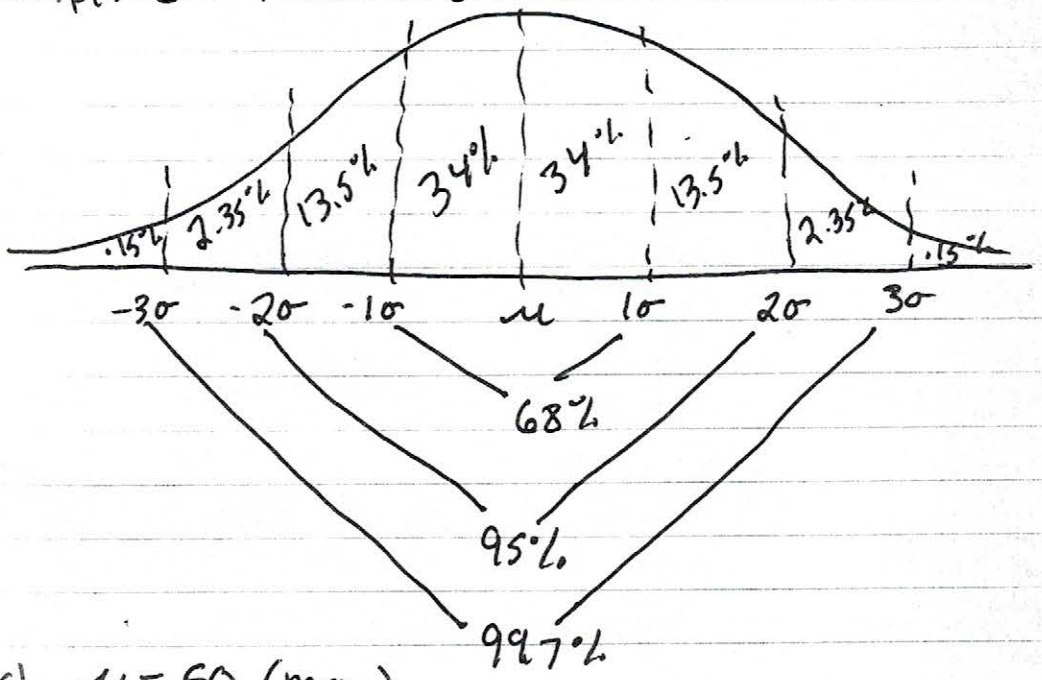
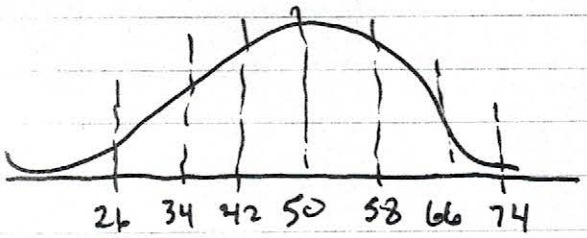
11.4 Normal Distributions

Empirical Rule 68-95-99.7



ex] $\mu = 50$ (mean)
$\sigma = 8$ (standard deviation)



a) What percent is between 34 and 58?
13.5 + 34 + 34 = 81.5%

b) What percent is above 58?
13.5 + 2.35 + .15 = 16%

over →

Z-score

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

ex] Your ACT score was a 32. The average ACT score is 21 with a standard deviation of 5. You also took the SAT and got 1380. The average score is 1000 with a standard deviation of 200. Which test did you do better?

ACT

$$Z = \frac{32 - 21}{5} = 2.2$$

SAT

$$Z = \frac{1380 - 1000}{200} = 1.9$$

You do better on the ACT

Finding Percents of a Z-score

1. less than - look up number in chart
2. greater than - 1 - the number you looked up

ex] a) $Z < 1.7$ $p =$

b) $Z > 2.32$ $p = 1 -$

c)