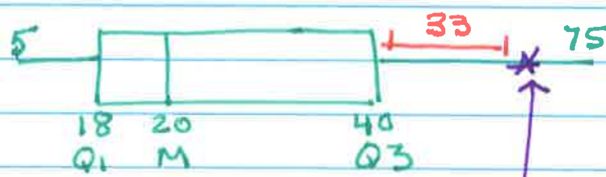
CUMULATIVE AP PRACTICE TEST #2

(Pg. 461 –)

AP2.1 (A)



OUTLIER $IQR * 1.5 + Q3 =$

$(40-18) * 1.5 + 40 =$

$22 * 1.5 + 40 =$

$33 + 40 = 73$

OUTLIER WOULD BE ANY VALUE $= 73^+$

Hence the max wiskar is 33.

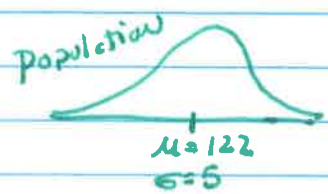
AP2.2 (D) X = # OF HEADS IN 4 TOSSES

P(AT LEAST 1 TAIL IN 4 TOSSES) = 1 − P(NO TAILS)

$= 1 - .0625 = \boxed{.9375}$

$P(x=4) = 4$ heads + 0 tails = .0625

AP2.3 (E)



Sample: SRS $n = 200$

CLT applies since $n \geq 30$

therefore the distribution is NORMAL.

$\mu_{\bar{x}} = \mu = 122$

$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{5}{\sqrt{200}}$

$\sigma_{\bar{x}} = .35$

AP2.4 (B) The simulation must represent the probability of 1/5. (B) provides the Correct probability

Correct answers: 0, 1 ⇒ 2 OUTCOMES

incorrect answers: 2, 3, 4, 5, 6, 7, 8, 9 = 8 OUTCOMES

There the probability $\frac{2}{10}$ reduces to 1/5

AP 2.5 (C)

Use the formula on the Green Sheet for a binomial distribution

B – 6 or NOT
I – dice
N – fixed # $n = 4$
S = $p = 1/6$

$$P(X=1) = \binom{n}{k} p^k (1-p)^{n-k}$$

$$= \binom{4}{1}\left(\tfrac{1}{6}\right)^1\left(\tfrac{5}{6}\right)^3$$

$$\boxed{P(x=1) = 4\left(\tfrac{1}{6}\right)\left(\tfrac{5}{6}\right)^3}$$

There are 4 possible outcomes

Calc 4 math Prob nCr > 1 = 4

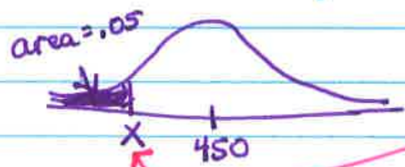
AP 2.6 (E)

955 | 92 9 | 400 | 769 | 335

AP 2.7 (C)

2016 bag $\longrightarrow N(450, 20)$

will replace bags 5% of bags w/ too few briquets



X=invNorm(.05, 450, 20)

$\boxed{X = 417.10}$

ROUND UP X = 418

AP 2.8 (A)

BLOCK TO DETERMINE IF THERE IS A DIFFERENCE BETWEEN 2 GROUPS – EMPLOYED OR NOT EMPLOYED

AP 2.9 (D)

P(INFECTION) = .03
P(REPAIR FAILS) = .14
P(INFECTION ∩ FAILURE) = .01

CREATE A TABLE

	INFECTION	NO INF	
FAIL	.01	.13	.14
SUCCESS	.02	.84	.86
	.03	.97	1.00

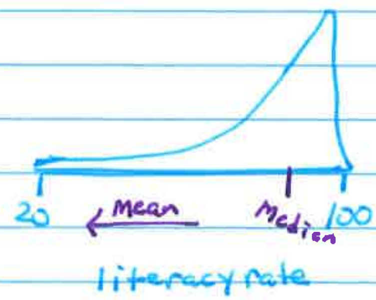
$$P(\text{Successful} \mid \text{No INFECTION}) = \frac{.84}{.97} = .86598 \rightarrow .8660$$

AP 2.10 C

Slope = -.620 X = HS graduation rate
$\hat{y}$ = predicted poverty

slope for each additional unit in X (1% grad rate) the predicted poverty rate decreases by .620 UNITS

AP 2.11 B



Shape is clearly skewed to the left

AP 2.12 C

Since the distribution is skewed left, the mean will be less than the median

AP 2.13 A

Since the distribution is skewed then the mean and standard deviation are NOT appropriate measures.

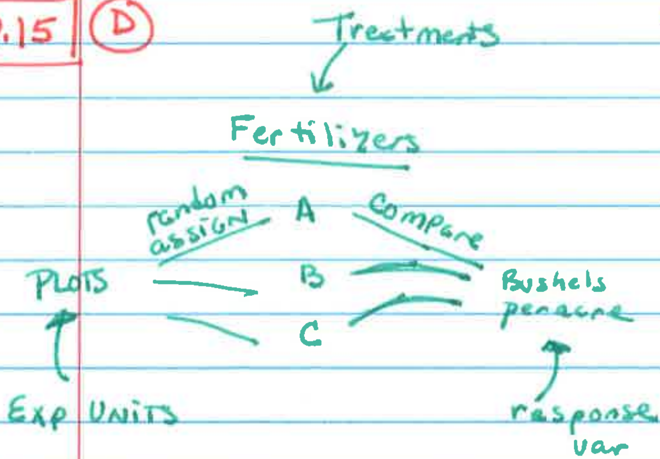
The 5 number summary is resistant measures. (min, Q1, median, Q3, max)

AP 2.14 C

$r = .60$ ← correlation coef measures the linear association

$r^2 = (.60)^2 = .36$ ← measures the % of the variation accounted for by the model.

AP 2.15 (D)



TREATMENT: FERTILIZER

EXPERimental UNITS: PLOTS OF LAND

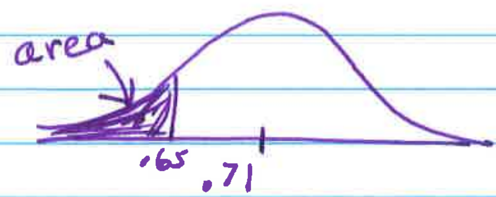
Response Variable: Bushels per acre

AP 2.16 (C)

own homes $p = .71$

Sample SRS $n = 100$

$\hat{p} = \frac{65}{100} = .65$



$$P\left(Z \leq \frac{.65 - .71}{\sqrt{\frac{(.71)(.29)}{100}}}\right)$$

See Green Sheet

$\mu_{\hat{p}} = p$

$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$

AP 2.17 (E)

Z score $= +2$ is 2 std deviations above the mean

AP 2.18 (A)

P(Born at NIGHT OR Female) $= \frac{233}{513} + \frac{252}{513} - \frac{116}{513} =$ $\frac{369}{513}$

Green Sheet

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= P(\text{NIGHT}) + P(\text{Female})$

$- P(\text{NIGHT AND FEMALE})$

AP 2.19 C

Box $\mu = 1.5$ lbs $\sigma = .3$ lbs
Packing $\mu = .5$ $\sigma = .1$
Books $\mu = 12$ $\sigma = 3$

WEIGHTS INDEPENDENT

$$\sigma_T = \sqrt{.3^2 + .1^2 + 3^2} = \sqrt{9.1} = 3.0166$$

AP 2.20 B

$$E(x) = 500(.01) + 100(.05) + 25(.2) + 0(.74) = \$15$$

answers are A, B, or C

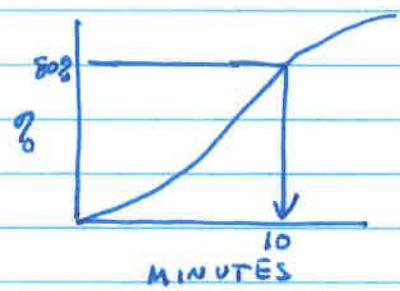
VAR(x)

① { L1 – \$'s
L2 – %

② { STAT > CALC > 1-VAR STATS < LIST: L1, FREQLIST: L2

$\Sigma x = \$15$ $\sigma_x = \$53.85$

AP 2.21 A



80% of calls completed in 10 or less minutes

AP 2.22

CLASSIFIED

200 people → TAKE OMEGA 3 → COMPARE CHOLESTEROL
→ DO NOT →

∴ 18 pts lower for people who take omega 3

(A) THIS IS AN OBSERVATIONAL STUDY
NO TREATMENTS WERE IMPOSED ON THE SUBJECT

(B) SINCE THIS WAS AN OBSERVATIONAL STUDY (AND NO TREATMENTS WERE IMPOSED) THEN WE CAN NOT MAKE ANY CAUSE-AND-EFFECT CONCLUSION. TO DO THIS WE MUST HAVE A RANDOMIZED CONTROLLED EXPERIMENT.

(C) TWO VARIABLES ARE CONFOUNDING WHEN THEIR EFFECTS ON THE RESPONSE VARIABLE (THE CHOLESTEROL LEVEL) CAN NOT BE DISTINGUISHED FROM ONE ANOTHER.

A POSSIBLE CONFOUNDING VARIABLE COULD BE DIET OR EXERCISE. PEOPLE WHO TAKE OMEGA-3 TEND TO BE MORE HEALTH CONSCIENCE. THERE FORE, THE LOWER CHOLESTEROL LEVELS FOR OMEGA 3 USERS COULD BE A RESULT OF THEIR HEALTHIER LIFE (DIET/EXERCISE) THE RESEARCHER CAN'T TELL IF THE RESULTS WERE FROM OMEGA-3 OF THEIR DIET/EXERCISE.

AP 2.23

BLOOD TYPE	HAWAII	HAWAII WHITE	HAWAII CHINESE	WHITE	TOTAL
O	1,903	4,469	2,206	53,759	62,337
A	2,490	4,671	2,368	50,008	59,537
B	178	606	568	16,252	17,604
AB	99	236	243	5,001	5,579
	4,670	9,982	5,385	125,020	145,057

(a)

P(TYPE O or HAWAIIAN CHINESE) =

P(TYPE O) + P(HAWAII CHINESE)

− P(TYPE O AND HAWAII CHINESE) =

$$\frac{62337}{145057} + \frac{5385}{145057} - \frac{2206}{145057} = \frac{65,516}{145,057} = .452$$

(b) $P(AB \mid \text{HAWAIIN}) = \frac{99}{4670} = 0.021$

(c) Are "TYPE B" and "HAWAIIN" INDEPENDENT

$P(\text{Hawaiin}) \stackrel{?}{=} P(\text{HAWAIIN} \mid \text{TYPE B})$

$$\frac{4670}{145057} \stackrel{?}{=} \frac{178}{17604}$$

$.032 \neq .010$

Since the 2 probabilities are NOT EQUAL THEN THEY ARE NOT INDEPENDENT.

(d) P(At least 1 of the 2 specimens Contain type A blood from White group) = 1 − P(Neither)

$1 - (.655)^2 =$ .571

P(TYPE A and WHITE) = $\frac{50,008}{145,057} = .345$

P(NOT TYPE A and White) = 1 − .345 = .655

AP 2.24

Experimental Units | TREATMENTS | RESPONSE VARIABLE

PLANTS WITH Cicade bugs (n = 39)

Plants

CONTROL PLANTS (n = 33)

Compare

SIZE OF SEED PRODUCED

(a) This is an EXPERIMENT because a treatment was imposed. Researchers added cicade bugs to some plants and none to other plants (Control Group).

(b) Reviewing the box plots

① Cicade Plant distribution is skewed right while the distribution of the Control Plant is slightly skewed to the left

② The medians for both groups is the same, approximately .25 mg seed mass.

③ The mean for Cicade Plants is higher. These plants are skewed right there fore the mean is pulled to the right and there fore it is higher

(c) Reviewing the numerical data, the medians are the same; and the IQR (11 and 12) are basically the same. The box plots show similar medians and the boxes are also similar. The Cicade Plant is skewed right. The mean for the cicade plants will be slightly higher than the control group but not large enough of a difference to rule out the's could be by chance in the random ASSIGNMENT AS A PLAUSIBLE EXPLANATION.

AP 2.25 (a) DIAMOND - WIN $5 $P = 1/5$
5 CARDS - Cost $1

1. ASSIGN DIAMOND THE NUMBERS 0 and 1 with numbers 2-9 representing the other cards
2. On the given random number table move left to right and look at each 1 digit at a time
3. Stop when you get a diamond
4. Count the number of cards drawn.

(b) 1 2 9 7 5 1 3 2 5 8 1 3 $\boxed{0}$ 4 8 4 5 1

4 4 7 2 3 2 1 8 1 9 4 $\boxed{0}$ $\boxed{0}$ $\boxed{0}$

#Cards 1, 5, 5, 2, 5, 7, 2, 3, 1, 1   10 simulations

(c) EXPECTED # OF CARDS TO GET A DIAMOND $= \frac{32}{10} = 3.2$

(d) At $1.00 per card, you would expect to pay $3.20, on average, in order to win $5. BASED ON THIS SIMULATION, IT IS A FAIR GAME.

The results would be different if you assign numbers 8+9 to diamonds.

10 simulations: 3, 7, 5, 11, 2, 12, 1, 7, 5, 3

Expected # cards $\frac{56}{10} = 5.6$ cards

This gives an expected pay of $5.60. THIS simulation would lead us to believe the game is NOT FAIR.