Algebra 2 Ch 11 Take Home Review Name/Per Key

T 11- 1: I can identify types of data collection and improve flaws in the design.

a. **Identify if this is a survey, experiment or observation.**
b. **Identify the sample, population and parameter.**
c. **Explain why the design is flawed and make a suggestion for improvement.**

1. A golf club manufacturer wants to test whether using a new type of club lowers golf scores. A random sample is taken. Golfers on the local college team are in the experimental group and are given the new club to use, and other students from the same college are in the control group and are asked to use their old clubs.
   a. experiment
   b. sample: golfers/other students from college
      population: golfers parameter: golf scores
   c. Golfers on a college team are likely to score lower than non-golfers
      TO fix have control be golfers too or exp have non-golfers in it.
2. A research company wants to test the claim that pretreating grass-stained clothes with Brand A Stainstick eliminates grass stains. The experimental group consists of grass-stained clothes pretreated with Brand A Stainstick and then washed with Brand A Detergent in warm water, and the control group consists of clothes with grass stains washed with Brand A Detergent in cold water.
   a. experiment
   b. sample: clothes w/stains population: all stained clothing
      parameter: cleanliness of clothing
   c. Cold/warm water clean differently - The same temp needs to be used.

Determine whether each survey question is *biased* or *unbiased*. If biased, explain your reasoning.

3. What is your current age? unbiased	**4.** Do you think teachers should be required to attend all home and away football games? Biased. The question addresses more than one issue but only allows for one answer.
5. Do you agree or disagree with the following statement? Teachers should not be required to not supervise students during lunch. Biased. The question is confusing because of the double negative.	**6.** Most teenagers text message during class. Are you one of them? Biased. Encourages a yes response.

T 11-2: I can describe a distribution of data and select appropriate measures of center and spread.

1. OLYMPICS The medal counts for the 2002 and 2010 Winter Olympics are shown.

2002
37, 3, 5, 2, 30, 11, 5, 1, 9, 14, 26, 11, 6, 3, 15, 1, 3, 11, 3, 23, 5, 8, 16, 3, 6, 1

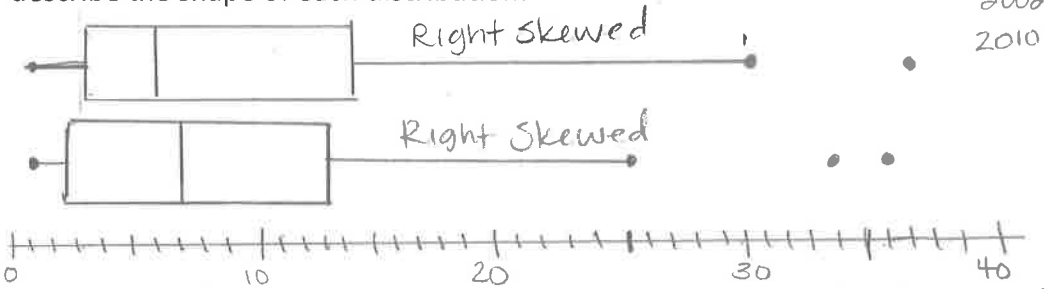
L6 n=26

2010
3, 8, 1, 25, 2, 34, 2, 3, 11, 13, 7, 17, 11, 4, 2, 8, 3, 13, 17, 7, 4, 36, 2, 1

L5 n=24

a. Use a graphing calculator to help you draw/construct a box-and-whisker plot for each set of data. Then describe the shape of each distribution.

2002: 1, 3, 6, 14, 37
2010: 1, 2.5, 7, 13,

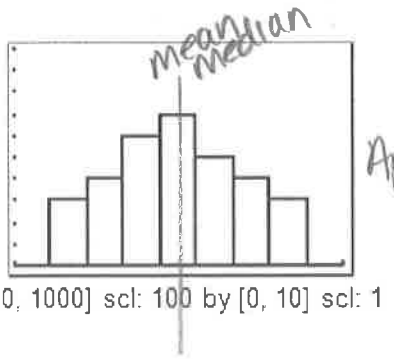


b. **Compare** the distributions using either the means and standard deviations or the five-number summaries. Justify your choice.

The distributions are skewed so use the 5# summary.
The min and max for 2002 are 1 and 37 } This means the
" " 2010 are 1 and 36 } data is distributed over the same range.
The IQRS are 11 and 10.5 showing the middle 50% is also over same range.
overall the distributions are very similar.

2. **Mark** approximately where the **mean** and **median** would be on each graph. Determine distribution and which would be the appropriate measure of center and spread to use for each graph.

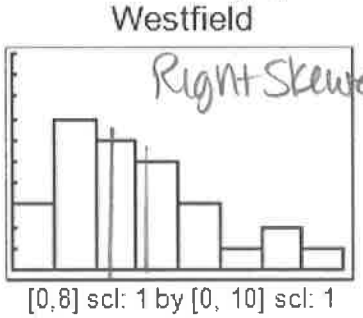
a.



Aprox Normal

Best Center to use: Mean
Spread that goes with that center: St. Dev

b.



Best Center to use: Median
Spread that goes with that center: Range / IQR

T 11- 3: I can construct a relative frequency table and find an expected value.

1. **DICE** Wendy has recorded the following results from rolling a loaded die, one in which the probabilities of it landing on each side are not equal.

Value ($)	1	2	3	4	5	6
Frequency	85	45	40	20	5	5

$= 200$

85/200 45/200

What is the expected value of one roll of the loaded die?

$$E(X) = 1\cdot\frac{85}{200} + 2\cdot\frac{45}{200} + 3\cdot\frac{40}{200} + 4\cdot\frac{20}{200} + 5\cdot\frac{5}{200} + 6\cdot\frac{5}{200} = \frac{430}{200} = 2.15$$

$E(X) = \$2.15$

2. **PRIZES** Kyle won a ticket for a prize. The distribution of the values of the tickets and their relative frequencies are shown. Find the expected value.

Value ($)	1	10	50	100	500	5000
Frequency	2000	300	120	75	4	1
Rel Freq	.8	.12	.048	.03	.0016	.0004

$= 2500$

$\frac{2000}{2500}$

$E(X) = 1(.8) + 10(.12) + 50(.048) + 100(.03) + 500(.0016) + 5000(.0004) = 10.2$

$E(X) = \$10.20$

3. At Tucson Raceway Park your horse, Soon-to-beat-you, has a probability of 1/20 of coming in first place, a probability of 1/10 of coming in second place, a probability of 1/5 for third place and a probability of 1/4 of coming in fourth place. First place pays $5,500 to the winner, second place $4,500 and third place $1000, and 4th place is $250. **Create a relative frequency table and find the expected value of the winnings.** Is it worthwhile to enter the race if it costs $1,000? → Strictly speaking NO. But it might be fun ☺

	1st	2nd	3rd	4th	other
$ outcome	5500	4500	1000	250	0
Rel Freq	.05	.1	.2	.25	.4

$E(X) = 5500(.05) + 4500(.1) + 1000(.2) + 250(.25) +$

$E(X) = \$987.50$ $\quad 987.5 - 1000 = -12.5$

4. You are playing a game at a carnival. It costs $6.00 to play. You draw one card from a standard deck of playing cards. If you pick a heart, you will win $10. If you pick a face card, which is not a heart, you win $8. If you pick any other card, you lose. **Create a relative frequency table and find the expected value of the game.** Would you play? Explain.

	Outcome	Rel Freq
♡	$10.00	13/52
FC	$ 8.00	9/52
other	$ 0	30/52

$$E(X) = \frac{130}{52} + \frac{72}{52} + 0 = \frac{202}{52} = 3.88$$

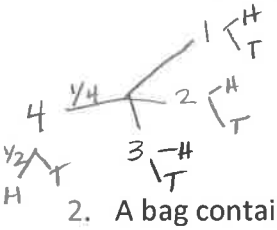
COST TO PLAY $6 $\quad 3.88 - 6 = -2.11$

You are expected to Lose. Don't play.

T 11- 4: I can use Tree diagrams to find probabilities.

1. A dice numbered 1 to 4 is rolled and 1 coin is tossed. **Draw a tree diagram and LIST the possible outcomes.**

a. Tree Diagram



b. Outcomes

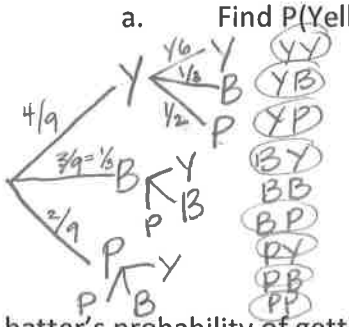
1H 2H 3H 4H
1T 2T 3T 4T

c. Find P(4 and H)

$P(4H) = \frac{1}{4} \cdot \frac{1}{2} = \frac{1}{8}$

2. A bag contains 4 yellow marbles, 3 blue marbles, and 2 pink marbles. A spinner has 1 yellow section, 2 blue sections and 3 pink sections (all equal size). Draw a tree diagram for the possible outcomes if you pick a marble and then spin the spinner.

a. Find P(Yellow and Pink) = 2/9



$\frac{4}{9} \cdot \frac{1}{2} = \frac{4}{18} = \frac{2}{9}$

b. Find P(Yellow or Pink) = 8/9

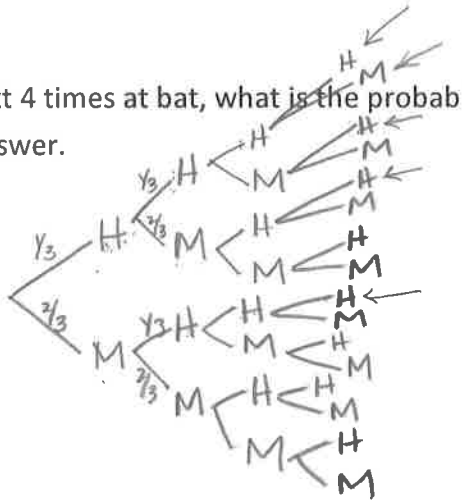
This is the same as $1 - P(BB)$

$P(BB)\ \frac{1}{3} \cdot \frac{1}{3} = \frac{1}{9}$

$1 - \frac{1}{9} = \frac{8}{9}$

3. A batter's probability of getting a hit is $\frac{1}{3}$. In his next 4 times at bat, what is the probability that he will get at least 3 hits? Draw a tree diagram to find the answer.

3H or More



$HHHH = \left(\frac{1}{3}\right)^4 = \frac{1}{81}$

$HHHM = \frac{1}{3} \cdot \frac{2}{3} = \frac{2}{81}$

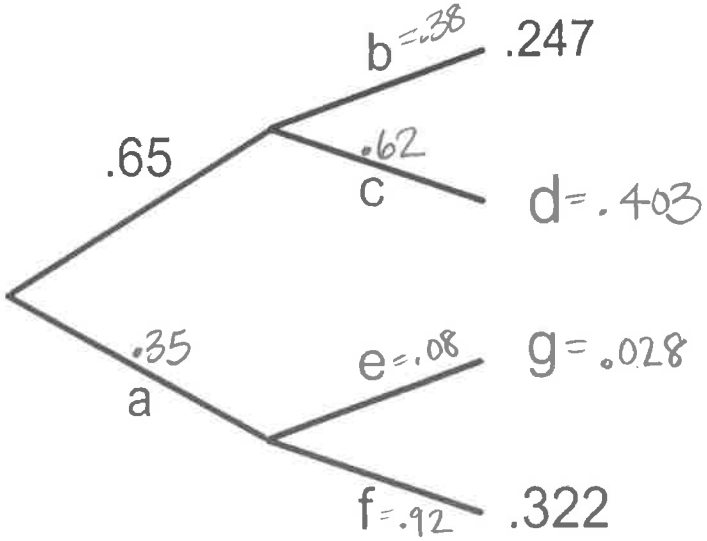
$HHMH = \frac{2}{81}$

$HMHH = \frac{2}{81}$

$MHHH = \frac{2}{81}$

$\frac{1}{81} + \frac{2}{81} + \frac{2}{81} + \frac{2}{81} + \frac{2}{81} = \frac{9}{81} = \frac{1}{9}$

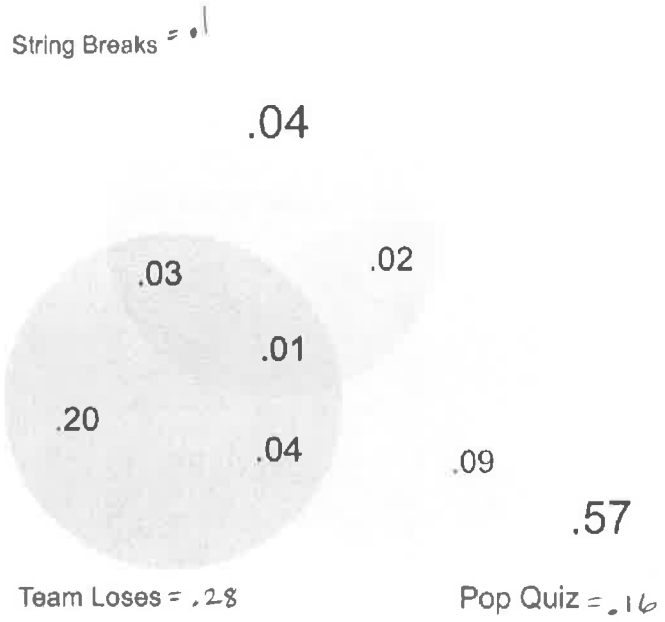
4. Find the missing values:



Check: $.247 + .403 + .028 + .322 = 1$ ✓

T 11- 5: I can use Venn diagrams to find probabilities.

Find the probability of:

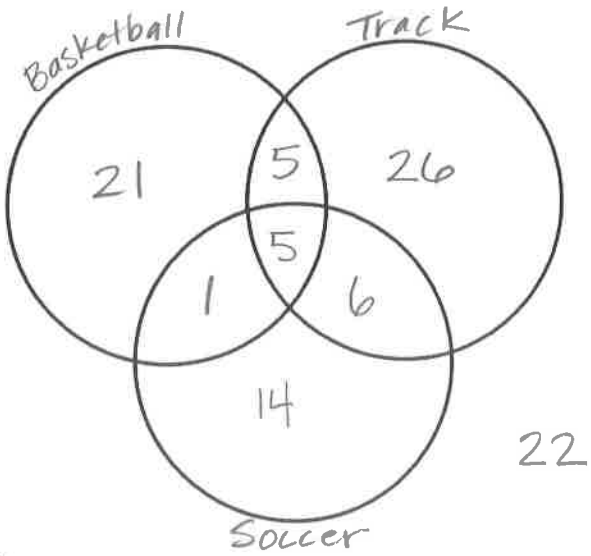


1. P(Team Loses and Pop Quiz) = $.04 + .01 = .05$
2. P(String Breaks or Pop Quiz) = .23
3. P(Team Loses or Pop Quiz) = .39
4. P(pop quiz)= .16
5. P(one bad event)= $.04 + .20 + .09 = .33$
6. P(no bad events) = .57
7. P(really bad day-all bad events)= .01
8. P(Team loses | Pop Quiz)= $\frac{.05}{.16} = .3125$
9. P(Team loses | String Breaks)= $\frac{.04}{.1} = .4$
10. P(String Breaks | Team loses)= $\frac{.04}{.28} = .143$

11. Create a Venn Diagram

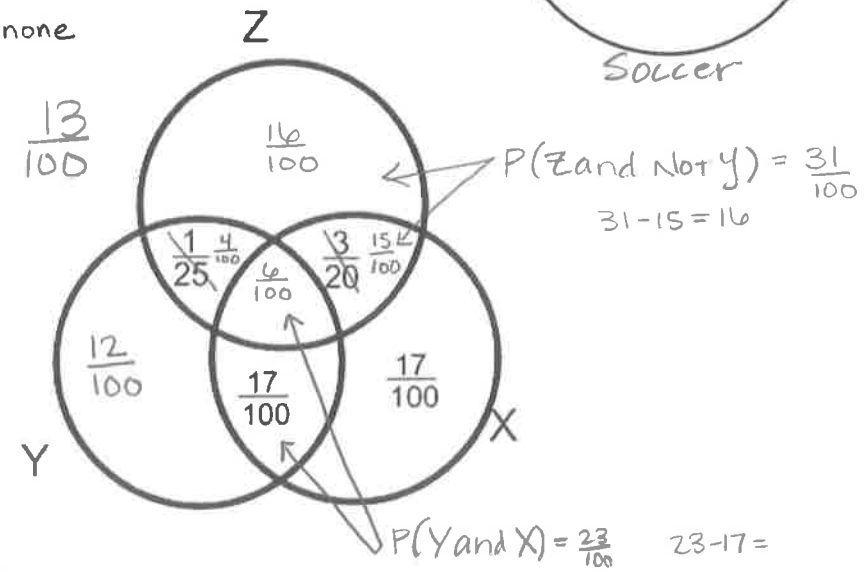
100 People were asked if they like Basketball, Track and Soccer.

- 5 people liked all three
- 6 liked Basketball and Soccer
- 11 liked Soccer and Track
- 10 liked Track and Baseball
- 42 liked Track
- 32 liked Basketball
- 26 liked Soccer



$B + T + S = 78$ $\quad 100 - 78 = 22$ none

12. Fill in the diagram.
Hint: get a common denominator



✓ P(Z and not Y) = $\frac{31}{100}$

✓ P(Y and X) = $\frac{23}{100}$

✓ P(Y) = $\frac{39}{100}$

P(not X or Y or Z) = $\frac{13}{100}$