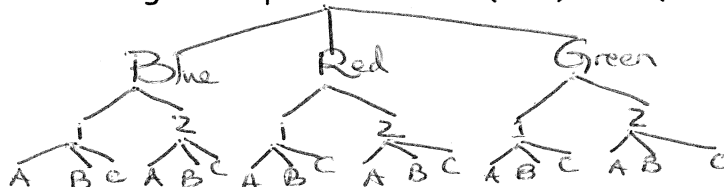


1. Create a tree diagram to represent the outfits you can make. You have a choice of three shirts (blue, red, and green), two pairs of pants (1 and 2), and three different jackets (A, B, and C). Then find the following three probabilities:  $P(B1A)$  and  $P(G2B)$  and  $P(RB)$ .

$$P(B1A) = \frac{1}{18}$$

$$P(G2B) = \frac{1}{18}$$

$$P(RB) = \frac{2}{18} = \frac{1}{9}$$



2. List the four-letter outcomes when the letters of the word "STOP" are rearranged. How many outcomes are there? Circle all the outcomes that are actually words in our language. What is the probability of selecting an outcome that is actually a word?  $4 \cdot 3 \cdot 2 \cdot 1 = 24$  outcomes  
 $6/24 = 1/4$  words

<u>STOP</u>	<u>POST</u>	TSPQ	<u>OPTS</u>
STPO	PO TS	TSOP	OPST
SPTQ	PTSQ	TPOS	OSTP
<u>SPO T</u>	PTOS	TPSQ	OSPT
SOPT	PSOT	<u>TOPS</u>	OTSP
SOTP	PSTO	TOSP	OTPS

3. The chart below shows the dinner choices at a local restaurant. How many possible outcomes are there if you choose one appetizer, one main dish, and one dessert?

<i>Appetizers</i>	<i>Main Dish</i>	<i>Dessert</i>
Chicken wings	Steak	Hot fudge sundae
Mozzarella sticks	Chicken sandwich	Apple pie
Nachos	Spaghetti	Brownies
Fried Mac & Cheese	Hamburgers	Cookies
Calamari	Grilled Salmon	Pumpkin Pie
	Seafood Lasagna	

$$5 \cdot 6 \cdot 5 = 150$$

4. Jack has four coins. How many outcomes are possible if Jack tosses all four coins?

$$2 \cdot 2 \cdot 2 \cdot 2 = 16$$

5. At Grandma's Goodies Galore ice cream shop, there are 20 different flavors of ice-cream and 15 topping choices. How many different choices do the little children have if they are allowed to have one scoop and one topping?

$$20 \cdot 15 = 300$$

6. Elizabeth wrote each letter of the word, OHIO STATE, on cards and put them into a hat. She pulled out a card, and without replacing it, drew a second card. What is the probability that Elizabeth first pulled out an O and then a T?

$$\frac{2}{9} \cdot \frac{2}{8} = \frac{1}{18}$$

7. There are 4 purple, 3 pink, and 10 blue marbles in a bag. Find the probability of selecting two purple marbles in a row, if once a marble is chosen it is not replaced.

$$\frac{4}{17} \cdot \frac{3}{16} = \frac{3}{68}$$

8. Joan flipped a coin 100 times during a mathematics experiment. The coin landed on tails 58 times. Is this the result you would have expected? Explain your reasoning.  
*We would expect 50 heads + 50 tails so, Joan got 8 more tails than expected.*
9. Jessie performs an experiment by spinning the arrow on a spinner. The spinner has five equal sections. The results of his experiment are shown in the table below.

Outcome	Frequency
Blue	11
Green	11
Orange	12
Red	8
Purple	10

Based on the data in the table, what is the experimental probability that the arrow will land on orange?

$$\frac{12}{52} = \frac{3}{13}$$

10. Brandon wants to conduct a survey as to whether sausages should be added to the pizzas sold in the school cafeteria. What would be a good way to sample people?

*ask every student who eats lunch in cafeteria*

11. Eva surveys a large number of students at a movie theater about their favorite weekend activity. Is her survey valid? Why or why not? Explain your reasoning.

*not valid b/c she only surveyed students at the movie theater... they obviously like to watch movies!*

12. Four students predicted how long it would take them to run around a city block. Their predictions and actual times are shown in the table below.

Student	Predicted Time (in seconds)	Actual Time (in seconds)
Usain Bolt	50	62
Wilma Rudolph	80	70
Louie Zamperini	85	76
Sandra Jones	65	72

Which student's predicted time is closest to his or her actual time?

*Sandra Jones predicted time!*

13. Connie predicts that 40 percent of all the birds she spots while bird watching will be cardinals. At the end of the day, she records that 12 out of the 25 birds she spotted were cardinals. How does Connie's prediction compare with the actual results.

*Predicted < actual*

$$40\% \text{ pred. } \frac{12}{25} = \frac{\text{actual } 48}{100} = 48\%$$

14. Name the type of graph based on its accomplishment listed below:

a. Shows a trend? *line graph*

b. Shows what proportion each category is of the whole? *circle graph*

c. Shows interval frequency? *histogram*

15. Below is the frequency chart showing the scores on the first Math Olympiad test this year.

Score	Frequency
0	3
1	8
2	7
3	4
4	1
5	0

23 total  
12<sup>th</sup> is middle!

Based on the data in the table, what is the median of the scores?

2

16. Based on the stem-and-leaf plot, what is the median of the data?

Stem	Leaf
8	0,2,3,4,5,7,8
7	1,1,3,5,8,9,9
6	2,4,4,5,5
5	0,2,3,3,5,6,

25  
so middle is 13<sup>th</sup>

71

17. What are the measures of central tendency?

mean median mode

18. What measure of central tendency should you use to portray "the average" if there are extreme values away from the rest of the data?

median

19. What is the only measure of center you can locate on a box plot?

median

20. What are measures of <sup>variability</sup> central tendency used to describe?

How data pts are clustered, the spread of the data,  
the distribution of the data

21. Which measure of variability describes the width of the middle 50% of the data?

interquartile range

22. Find the mean absolute deviation of 5, 7, 8, 10, 12, and 48.

$$\frac{5+7+8+10+12+48}{6} = \frac{90}{6} = 15$$

$$|15-5| = 10$$

$$|15-7| = 8$$

$$|15-8| = 7$$

$$|15-10| = 5$$

$$|15-12| = 3$$

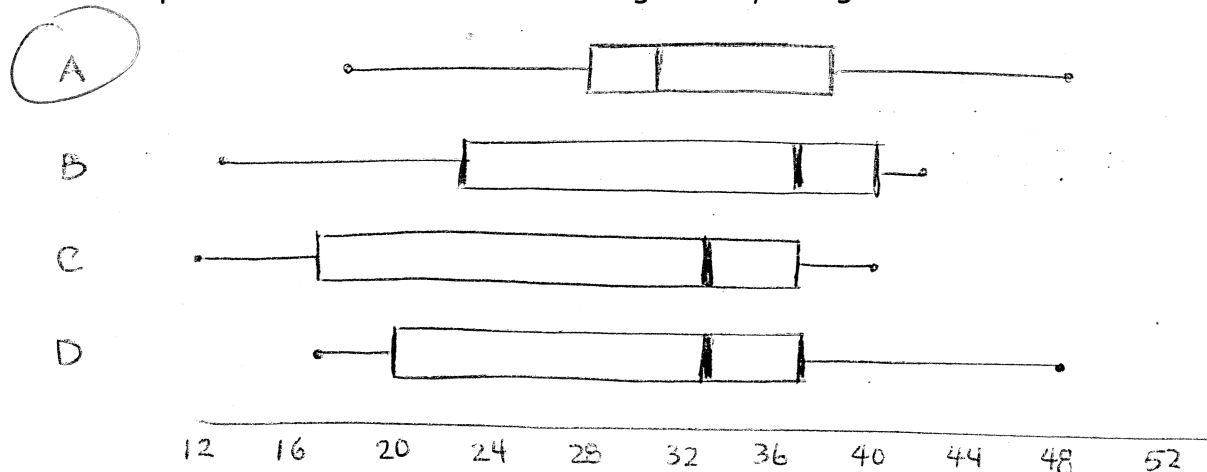
$$|15-48| = 33$$

$$\frac{10+8+7+5+3+33}{6} = \frac{66}{6} = 11$$

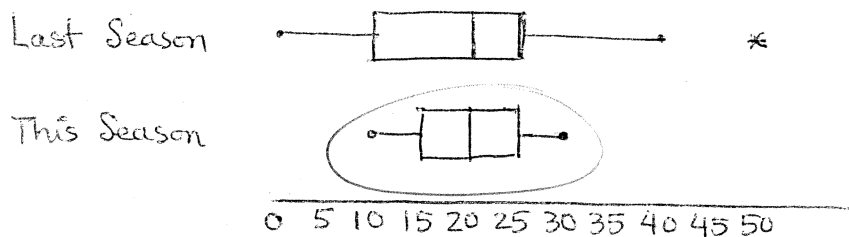
23. What is a random sample?

A <sup>representative</sup> sample of the population in which each outcome has an equally likely chance of being selected!

24. Which box plot shows data values that are generally the greatest?

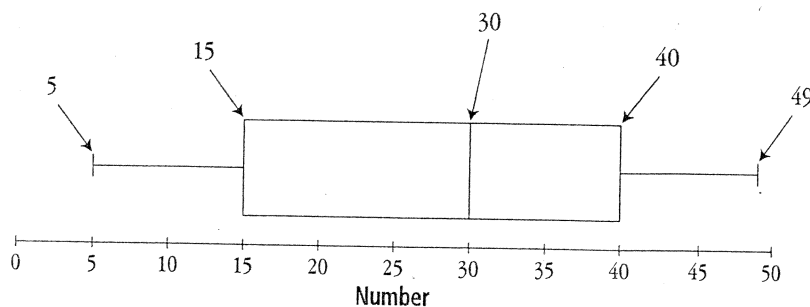


25. The double box plot shows the number of points scored by the football team for two seasons. During which season was the team's performance more consistent?



This season b/c the spread is not great, the range is small, and the distribution of the middle is small too!

26. Using the box plot, what is the range of the numbers? The interquartile range? Which number represents the median? The lower quartile? The upper quartile? Are 5 and 49 outliers? Explain.



range  $49 - 5 = 44$

interquartile range =  $40 - 15 = 25$

median = 30

LQ = 15

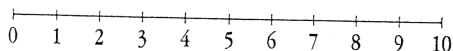
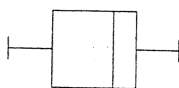
UQ = 40

5 + 49 are not outliers  
b/c they are not

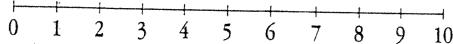
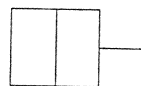
1.5 times the interquartile  
range beyond either  
the LQ or  
UQ.

27. These box plots represent the distribution of the ratings given to four movies by 20 newspapers and magazines. Compare the box plots.

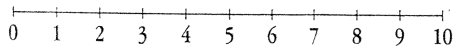
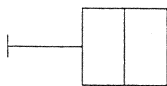
Movie A



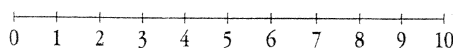
Movie B



Movie C



Movie D



Movie B  
highest ratings

Movie A most diversity  
and spread + lowest.

For questions 28 and 29, use the following information.  $Q_3$  represents the third quartile,  $Q_1$  represents the first quartile. Look at the equations in the table.

$Q_3 - Q_1 = x$	$Q_3 + 1.5x = A$	$Q_1 - 1.5x = B$
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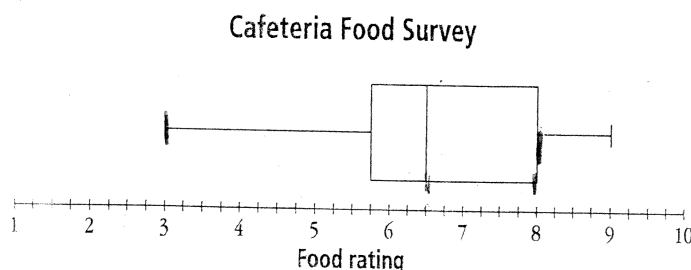
28. Using the information in above, what does  $x$  represent?

*interquartile range*

29. Again, still using the information above, anything more than  $A$  or less than  $B$  is called:

*outlier*

30. In a survey of the cafeteria food at Metropolis Middle School, 50 students were asked to rate how well they liked the lunches on a scale of 1 to 10, with 1 being the lowest rating and 10 being the highest rating. The box plot below was made from the collected data. What percent of the students in the sample rated the cafeteria food between 3 and 8?



*75%*

31. Using the box plot above, a rating of 6.5 to 8 indicates "satisfied" on the rating scale. What percent of students in the sample are "satisfied" with the cafeteria food?

*25%*

32. Based on the same sample data, how many of the 2000 students at Metropolis do you estimate would rate the cafeteria food between 6.5 and 8?

*25% (2000) = 500 students!*