Math 2311
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Office Hours: MW 11am to 12:45pm in 639 PGH
Online Thursdays 4-5:30pm
And by appointment

Class webpage: http://www.math.uh.edu/~bekki/Math2311.html
2.1 Counting

- Multiply choiced
- Order matters - permutation \( nPr = \frac{n!}{(n-r)!} \)
- Order doesn't matter - combinations \( \binom{n}{r} \) or choose \((n, r)\)

Ex. 21

21. How many ways can the letters of the word COMPUTER be arranged if the first letter cannot be a vowel?

\[
\begin{array}{ccccccc}
5 & 7 & 6 & 5 & 4 & 3 & 2 & 1 \\
\hline
q: & & & & & & & \\
\hline
\text{non vowels} \\
\end{array}
\]
There are 52 colored balls in a large tumbler, 13 red, 13 blue, 13 yellow, and 13 green. The balls of each color are lettered A through M. Five balls are chosen at random.

5 card hands? \( \binom{52}{5} \) choose(52,5)

4 Queens? \( \overline{\text{Q Q Q Q}} \) \( \binom{4}{4} = 1 \) \( 48 \times 48 = 48 \)

4 Queens or 4 Kings? \( 2 \binom{4}{4} \times 48 = 96 \)

Any 4 of a Kind? \( 13 \binom{4}{4} \times 48 = 624 \)
Full house? \( 3 \) of a kind + \( 2 \) of another kind

\[
\begin{align*}
\square \square \square \quad \square \square \\
\end{align*}
\]

\[
\begin{align*}
13 \binom{4}{3} \cdot 12 \binom{4}{2} &= 3744 \\
\end{align*}
\]

\( A_j, 2, 3, \ldots, K \) any other suit than \( A \)
Question 14

Given a data set consisting of 33 unique whole number observations, its five-number summary is: $[12, 24, 38, 51, 64]$

How many observations are less than 38?

a) 15
b) 17
c) 37
d) 16

50% are less than this.
Question 13

The weights of male and female students in a class are summarized in the following boxplots:

Which of the following is NOT correct?

a) The male students have less variability than the female students.  
   - males are more spread out => greater variability

b) About 50% of the male students have weights between 150 and 185 lbs.

c) The mean weight of the female students is about 120 because of symmetry.  
   = when symmetric mean = median

d) The median weight of the male students is about 166 lbs.
For problems 5 and 6, explain why the conclusion drawn is not valid and give an example of why it is not valid.

5. A businesswoman calculates that the median cost of the five business trips that she took in a month is $600 and concludes that the total cost must have been $3000.

6. A company executive concludes that an accountant must have made a mistake because she prepared a report stating that 90% of the company's employees earn less than the mean salary.

7. The test scores of a class of 30 students have a mean of 75.6 and the test scores of another class of 24 students have a mean of 68.4. Find the mean of the combined group.

5. Error is this should be mean so that $5(600) = 3000$

example why wrong: 100 200 600 650 660

total $52310 \neq 3000$

6. Executive is wrong - you can have 90% below mean (by median then 50%)

ex 100 employees make $40k + 1 person makes $1,000,000

mean $\approx 49,000$

7. $\frac{30(75.6) + 24(68.4)}{54}$
Draw a Venn Diagram for the following situation: A group of 100 people are asked about their preference for soft drinks. The results are as follows:

- 55 Like Coke
- 25 Like Diet Coke
- 45 Like Pepsi
- 15 like Coke and Diet Coke
- 5 Like all 3 soft drinks
- 25 Like Coke and Pepsi
- 5 Only like Diet Coke
median of upper 50%
IQR - inter quartile range
range of middle 50% of data
resistant to outliers

Q3 - Q1

to find outliers

1.5 (IQR)

Outlier boundaries
A cumulative frequency plot of the percentages (also called an ogive) can be used to view the total number of events that occurred up to a certain value.

Example: Here is an ogive for Hudson Auto Repair’s cost of parts sold:

Where is the median of this data?
# 4  b) ± IQR

\[ Q1 - 1.5(IQR) \quad \text{outlier boundaries} \]
\[ Q3 + 1.5(IQR) \]

c. put in order \( \rightarrow x_{10} \)

\[ \frac{100 \ (i - .5)}{n} \]
\[ \frac{100 \ (10 - .5)}{n} \]