

Math 1332 Contemporary Math
Class time:

Fall 2018 Exam III
Name (Print): _____

1. (20 points) Find the mean, median, and mode for following data and also find outliers if exists:

(a) 7, 3, 3, 11, 12, 3, 4, 14, 6, 4, 3, 53, 4, 14, 6

$n=15$

3, 3, 3, 3, 4, 4, 4, 6, 6, 7, 11, 12, 14, 14, 53

$$\text{mean} = \frac{3+3+3+3+4+4+4+6+6+7+11+12+14+14+53}{15} = \frac{147}{15} = 9.8$$

$$\text{median} = 6$$

$$\text{mode} = 3$$

$$\text{outlier} = 53$$

(b) 53, 52, 75, 62, 68, 58, 49, 49

$n=8$

49, 49, 52, 53, 58, 62, 68, 75

$$\text{mean}(\bar{x}) = \frac{49+49+52+53+58+62+68+75}{8} = \frac{466}{8} = 58.25$$

$$\text{median} = \frac{53+58}{2} = \frac{111}{2} = 55.5$$

$$\text{mode} = \text{most repeated} = 49$$

No outliers.

2. (20 points) Find the five point summary, range and standard deviation of the following.

(a) 98, 92, 95, 87, 96, 90, 65

65, 87, 90, 92, 95, 96, 98

Lowest value = 65

Highest value = 98

median = 92

1st quartile / lower quartile = 87

2nd quartile / upper quartile = 96

Range = Highest - Lowest
 $= 98 - 65$
 $= 33$

(b) 12, 7, 9, 10, 7, 8

7, 7, 8, 9, 10, 12 $n=6$

Lowest value = 7

Highest value = 12

median = $\frac{8+9}{2} = \frac{17}{2} = 8.5$

1st quartile / lower quartile = 7

2nd quartile / upper quartile = 10

Range = Highest - Lowest = $12 - 7 = 5$

for standard deviation:

$n=6$

$$\bar{x} = \frac{7+7+8+9+10+12}{6} = \frac{53}{6}$$

$$= \frac{53}{6}$$

$$= 8.8 \approx 9$$

For Standard deviation.

$$n=7$$

$$\bar{x} = \frac{65+87+90+92+95+96+98}{7}$$

$$= \frac{623}{7} = 89$$

X	$x - \bar{x}$	$(x - \bar{x})^2$
65	-24	576
87	-2	4
90	1	1
92	3	9
95	6	36
96	7	49
98	9	81
Total		756

$$\sigma = \sqrt{\frac{756}{n-1}} = \sqrt{\frac{756}{6}}$$

$$= \sqrt{126} = 11.23$$

X	$(x - \bar{x})$	$(x - \bar{x})^2$
7	-2	4
7	-2	4
8	1	1
9	0	0
10	1	1
12	3	9
Total		19

$$\sigma = \sqrt{\frac{19}{6-1}} = \sqrt{\frac{19}{5}} = \sqrt{3.8}$$

$$= 1.95$$

3. (5 points) Find the probability distribution table for the sample space when tossing two coins.

HH, HT, TH, TT

data	probability
2 H	$\frac{1}{4}$
1 H	$\frac{2}{4}$
0 H	$\frac{1}{4}$
Total = 1	

4. (10 points) Use theoretical method to compute the probability when tossing two coins:

(a) Exactly two head

HH, HT, TH, TT

$$P(HH) = \frac{1}{4}$$

(b) Exactly one Tail

$$P(TH \text{ or } TH) = \frac{2}{4} = \frac{1}{2}$$

(c) At least one head.

$$P(HH \text{ or } TH \text{ or } TH) = \frac{3}{4}$$

(d) No head

$$P(TT) = \frac{1}{4}$$

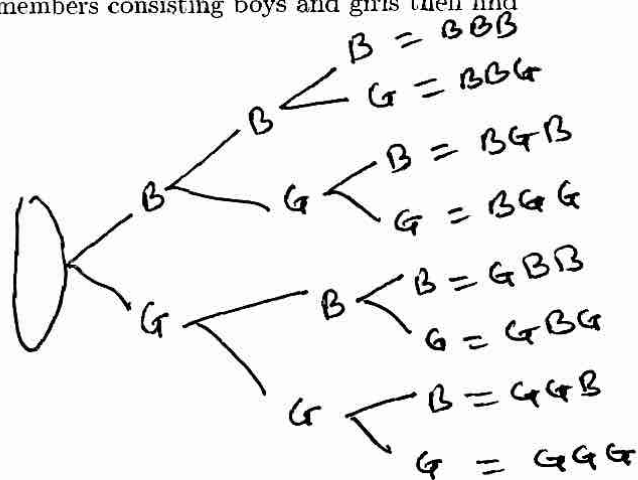
5. (10 points) When forming a committee of three members consisting boys and girls then find

(a) All girls

$$P(GGG) = \frac{1}{8}$$

(b) Exactly two boys

$$P(\text{Exactly two Boys}) = \frac{3}{8}$$



(c) At least two boys

$$= \frac{4}{8} = \frac{1}{2}$$

(d) No girls

$$P(BBB) = \frac{1}{8}$$

6. (10 points) When rolling a die in one hand and tossing a coin in another hand then what is the probability of

(a) P(5 and H)

$$P(S) = \frac{1}{6} \quad P(H) = \frac{1}{2}$$

$$\begin{aligned} & P(S) \times P(H) \\ &= \frac{1}{6} \times \frac{1}{2} \\ &= \frac{1}{12} \end{aligned}$$

(b) P(Even numbers and T)

$$\text{Even number} = \{2, 4, 6\}$$

$$P(\text{Even number}) = \frac{3}{6} = \frac{1}{2}$$

$$P(T) = \frac{1}{2}$$

$$P(\text{Even numbers} \times T) =$$

$$\boxed{P(\text{Even}) \times P(T) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}}$$

$$\begin{aligned} & P(\text{Even number}) \times P(T) \\ &= \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \end{aligned}$$

7. (10 points) There are 10 tennis balls in a bag of two different colors 6 red and 4 White balls. John wants to take out two balls from that bag then what the the following probability

$$\begin{aligned} \text{(a) } P(\text{Red and Red}) &= P(R \text{ and } R) = P(R) \times P(R/R) \\ &= \frac{6}{10} \times \frac{5}{9} = \frac{30}{90} = \frac{1}{3} \end{aligned}$$

$$\begin{aligned} \text{(b) } P(\text{White and Red}) &= P(W \text{ and } R) = P(W) \times P(R/W) \\ &= \frac{4}{10} \times \frac{6}{9} = \frac{24}{90} = \frac{4}{15} \end{aligned}$$

8. (15 points) There are 20 cards in a deck of card numbering from 1 through 20 that is $S = \{1, 2, 3, \dots, 20\}$. And Events $A = \{\text{Even numbers}\}$, $B = \{\text{multiple of 5}\}$ and $C = \{3, 7, 13\}$ then find the following probability

(a) $P(A \text{ or } B)$

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

$$= \frac{10}{20} + \frac{4}{20} - \frac{2}{20}$$

$$= \frac{14-2}{20} = \frac{12}{20} = \frac{3}{5}$$

$$A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\} \quad P(A) = \frac{10}{20}$$

$$B = \{5, 10, 15, 20\} \quad P(B) = \frac{4}{20}$$

$$C = \{3, 7, 13\} \quad P(C) = \frac{3}{20}$$

(b) $P(A \text{ or } C)$

$$= P(A) + P(C)$$

$$= \frac{10}{20} + \frac{3}{20}$$

$$= \frac{13}{20}$$

(c) $P(B \text{ or } C)$

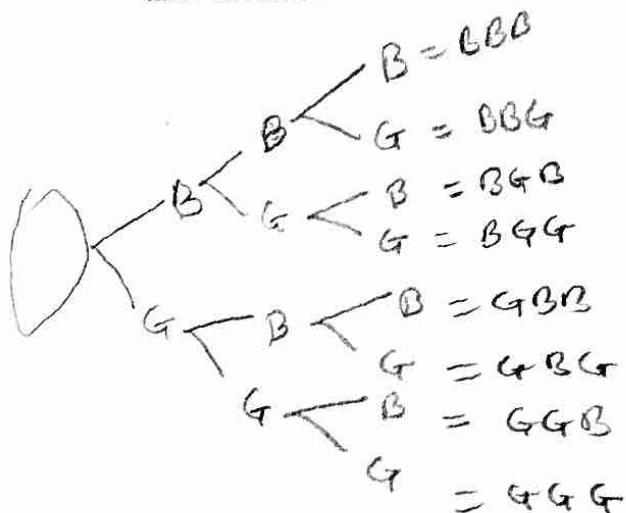
$$P(B) + P(C)$$

$$= \frac{4}{20} + \frac{3}{20}$$

$$= \frac{7}{20}$$

...

9. (5: points) (Bonus) Make a probability distribution table for the number boys in a family of three members.



Boys	probability
3	$\frac{1}{8}$
2	$\frac{3}{8}$
1	$\frac{3}{8}$
0	$\frac{1}{8}$
Total	1