

**Set Theory – Chapter 7 :**

- (1) Let  $U = \{12, 14, 16, 18, 20, 22, 24, 26\}$ ,  $A = \{12, 14, 16\}$ ,  $B = \{12, 20, 26\}$ , and  $C = \{26\}$ .

List the members of each of the following sets, using set braces.

$$A' = \underline{\hspace{10em}}$$

$$A \cap B = \underline{\hspace{10em}}$$

$$A \cup C' = \underline{\hspace{10em}}$$

$$(A \cap B) \cup C = \underline{\hspace{10em}}$$

$$A' \cup B' = \underline{\hspace{10em}}$$

- (2) Shade a Venn Diagram to represent the following sets:

a.  $(A \cup B') \cap C$

b.  $(B \cup C)' \cup A$

- (3) A survey of 72 children found:

37 take music lessons

33 take dance lessons

29 take tennis lessons

12 take dance and tennis lessons

15 take dance and music lessons

13 take tennis and music lessons

10 take music, dance, and tennis lessons

How many children take none of these types of lessons?

How many children take music or dance lessons?

How many children take music or dance lesson BUT NOT tennis lessons?

How many children take only tennis lessons?

- (4) In a survey of 60 people, it was found that :
- 25 watch The Walking Dead
  - 26 watch Once Upon a Time
  - 26 watch Game of Thrones
  - 9 watch both The Walking Dead and Once Upon a Time
  - 11 watch both The Walking Dead and Game of Thrones
  - 9 watch Game of Thrones and Once Upon a Time
  - 3 watched all 3 shows

How many people watch exactly two of the three shows?

How many people watch exactly one of the shows?

How many people do not watch any of these shows?

How many people watch Once Upon a Time or Game of Thrones BUT NOT The Walking Dead

### **Multiplication Principle, Combinations, and Permutations – Chapter 8:**

- (1) Evaluate the following expressions:

a.  $\frac{10!}{4!(10-4)!} = \underline{\hspace{2cm}}$

b.  ${}_8P_3 = \underline{\hspace{2cm}}$

c.  ${}_7C_4 = \underline{\hspace{2cm}}$

- (2) How many different sets of answers are possible on a test with 8 true-false questions?  $\underline{\hspace{2cm}}$

- (3) A student has a 7-question multiple-choice test with four possible answers for each question. How many different ways can the student “guess” at all the answers?  $\underline{\hspace{2cm}}$

- (4) A coffee shop offers 5 types of coffee, 3 different creamers, and 4 pastries. In how many ways can one of each be selected?  $\underline{\hspace{2cm}}$

(5) How many ways can a president and vice-president be selected in a class of twenty-five students? \_\_\_\_\_

(6) How many ways can a three person committee be chosen from a group of six people? \_\_\_\_\_

**Probability- Chapters 7 & 8:**

(1) A box contains 6 white marbles, 3 red marbles, 2 black marbles, and 4 orange marbles.

a. What is the probability that you pick a black marble? \_\_\_\_\_

b. What is the probability that you pick a white OR red marble?  
\_\_\_\_\_

c. What is the probability you pick a marble that is not orange?  
\_\_\_\_\_

(2) A pair of dice is rolled once. Find the following probabilities for the sum of the dice:

a.  $P(7)$  \_\_\_\_\_

b.  $P(4)$  \_\_\_\_\_

c.  $P(7 \text{ OR } 4)$  \_\_\_\_\_ are these mutually exclusive events? \_\_\_\_\_

d.  $P(\text{sum is even OR greater than } 7)$  \_\_\_\_\_ are these mutually exclusive events? \_\_\_\_\_

(3) Determine if the following probabilities are valid for an event. If NOT VALID \_ TELL ME WHY!

a.  $P(1) = .3$   $P(2) = .7$   $P(3) = .2$  \_\_\_\_\_

b.  $P(1) = .75$   $P(2) = -.15$   $P(3) = .35$  \_\_\_\_\_

c.  $P(1) = .25$ ,  $P(2) = .35$ ,  $P(3) = .40$  \_\_\_\_\_

(4) If a single card is drawn randomly from a standard 52-card deck, find the probability that it will be a black card or a 9.

(5) Given  $P(E) = .55$ ,  $P(F) = .80$ , and  $P(E \cup F) = .95$  find:

a.  $P(E \cap F) =$  \_\_\_\_\_

b.  $P(E|F) =$  \_\_\_\_\_

c.  $P(E' | F) =$  \_\_\_\_\_

d. Are events E and F independent? \_\_\_\_\_

(6) Jake estimates he has a 50% chance of getting an A in Math 114 and a 25% chance of getting an A in Science, he also estimates that he has a 60% chance of getting an A in either Math 114 or Science.

a. What is the probability that Jake gets an A in both classes? \_\_\_\_\_

b. What is the probability that poor Jake doesn't get an A in either Math 114 or Science? \_\_\_\_\_

(7) I am going on a road trip and I want to take 5 cds with me to play in my car. If my cd collection includes: 4 Elton John cds, 5 Adele cds, and 7 Jason Mraz cds find:

- a. The number of ways I can randomly select 5 cds from my collection.
  
  
  
  
  
  
  
  
  
  
- b. What is the probability that I pick 2 Elton John cds, 1 Adele cd, and 2 Jason Mraz cds?
  
  
  
  
  
  
  
  
  
  
- c. What is the probability I pick exactly 3 Elton John cds?
  
  
  
  
  
  
  
  
  
  
- d. What is the probability I select between 2 and 4 Jason Mraz cds?
  
  
  
  
  
  
  
  
  
  
- e. What is the probability I pick 5 Elton John cds?

(8) I flip a coin four times, find the probability that I get

- a. All heads (4 heads) \_\_\_\_\_
  
  
  
  
  
  
  
  
  
  
- b. Two heads and two tails \_\_\_\_\_

(9) LeBron James has a 75% chance of making a foul shot. If he shoots 10 foul shots what is the probability that he

- a. Makes exactly 6 shots? \_\_\_\_\_
  
  
  
  
  
  
  
  
  
  
- b. Makes between 7 and 9 shots, inclusive? \_\_\_\_\_
  
  
  
  
  
  
  
  
  
  
- c. Makes at least 4 shots? \_\_\_\_\_

(10) In a class of twelve students there are 8 students wearing jeans, the rest of the student are not wearing jeans. If I decide to take three random students to the movies find the probability that

- a. I take exactly 2 students wearing jeans. \_\_\_\_\_
- b. I take at least 2 students wearing jeans. \_\_\_\_\_
- c. I take 0 students wearing jeans \_\_\_\_\_

(11) A university cafeteria surveyed the students who ate breakfast there for their coffee preferences. The findings are as follows:

	Do not drink coffee	Prefer regular coffee	Prefer decaf-coffee	
Female	60	125	20	
Male	25	140	15	

- a. Find the probability that a random person selected – does not drink coffee.
- b. Find the probability that a random person selected – is male.
- c. Find the probability that a random person selected – is a female who prefers regular coffee.
- d. Find the probability that a random person selected – is a male, given that the student prefers decaf.
- e. Find the probability that a random person selected – is female, given that the student prefers regular coffee OR does not drink coffee.

(12) Find the expected value for the random variable:

$x$	0	1	2	3
$P(x)$	0.1	0.4	0.3	0.2

**Statistics – Chapter 9:**

- (1) Using the following frequency chart for ages of senators in the 103rd Congress calculate the mean, mode, and median. Hint: you will need to calculate the midpoint for each class.

Age (yrs)	Frequency
30-39	8
40-49	22
50-59	33
60-69	25
70-79	9
80-89	3

- (2) A student's quiz scores over a semester are:

8, 9, 8, 6, 8, 7, 10, 9, 8, 10, 9, 5

Find the Mean \_\_\_\_\_

Median \_\_\_\_\_

Mode \_\_\_\_\_

Range \_\_\_\_\_

(3) The following data is given:

72, 135, 2, 130, 16, 34, 108, 22, 140, 117, 140, 119, 146, 135, 60, 145, 135, 71, 48, 44,  
100, 51, 60, 109, 7, 137, 14, 86, 120, 63

a. Create a frequency chart with 6 classes starting with the interval 2-26

b. Construct a frequency polygon

c. Construct a histogram

- (4) The following test scores are a random sample from all students at Cabrini taking the Math 114 final. Calculate the Mean, Range, Variance, and Standard Deviation. (This table may not be given to you on the final.)

Test Score	$\bar{x}$	$(x - \bar{x})$	$(x - \bar{x})^2$
99			
62			
53			
85			
89			
95			
82			
80			
100			
75			

What would you do differently if the data above was data from the entire population?

- (5) Using the  $z$ -score table in the back of your textbook what is the area under the normal distribution curve

a. to the left of  $z = 1.35$  \_\_\_\_\_

b. to the right of  $z = 1.63$  \_\_\_\_\_

c. in between  $z = 1.20$  and  $z = 1.70$  \_\_\_\_\_

(6) Given the values for population mean ( $\mu$ ) and population standard deviation ( $\sigma$ ) calculate the  $z$  values for the specified  $x$  value.

a.)  $\mu = 65, \sigma = 10, x = 72$   $z =$  \_\_\_\_\_

b.)  $\mu = 310, \sigma = 70, x = 220$   $z =$  \_\_\_\_\_

c.)  $\mu = 1000, \sigma = 400, x = 560$   $z =$  \_\_\_\_\_

(7) Customers at Starbucks spend an average of \$5.00 with a standard deviation of \$1.25. Assume this is a normal distribution, find the following:

a. What percentage of customers spend less than \$6.00? \_\_\_\_\_

b. What is the probability the customer spends less than \$3.75? \_\_\_\_\_

c. What percentage of customers spent between \$3.50 and \$6.00? \_\_\_\_\_

d. What percentage of students spent less than \$3.50 or more than \$6.00? \_\_\_\_\_