1) Let \( A = \{b, c, 1, 2, 3\}, B = \{a, d, e, 4\}, C = \{e, 4\}, D = \{a, d, e, 2\} \) and \( U = \{a, b, c, d, e, 1, 2, 3, 4\} \). Find the following:

- a) \( A \cap C \)
- b) \( A \cap D \)
- c) \( B' \cap D \)
- d) \( C \cup D \)

1) If all elements in \( U \) are equally likely to occur then find \( P(B) \)

2) 25 runners are competing in a race. The top three will be selected to go to the Olympics. How different groups of three can go to the Olympics? (no ties)

3) 25 runners are competing in a race. First place gets a gold medal, second silver, and third bronze. In how many different ways can the medals be awarded? (no ties)

4) A license plate with 5 characters is being made. The first three must be letters \((A – Z)\) and the last two must be numbers \((0 – 9)\). How many different license plates are possible?

5) How many license plates would be possible (from problem 4) if the first two characters must be “AZ”?

6) Timmy has 3 red squares and 2 blue squares that he must put in a line. If the squares of the same color are indistinguishable from each other, then how many ways can he do this?

7) One card is chosen at random from a standard 52 card deck. Find the following probabilities. Answer in fraction form. You need not reduce the fraction.

- It is a Jack.
- It is a black queen.
- It is not a Jack.
- It is a 4 or a red card.

8) If two cards are selected from a standard 52 card deck, find the following probabilities. Answer in fraction form. You need not reduce the fraction.

- Both are Aces.
- No Aces.
- Exactly one is an Ace

9) Mya is ordering a Ferrari. She must choose between seven colors and then between three different engines. After that, she must choose to get a manual or an automatic. How many different ways can she order the Ferrari.
10) There are 74 people on a private beach. 43 are female, 28 people have sunburns, and there are 17 males without sunburns. (fraction form)

a) How many sunburned males are there?

b) Find the probability that a female has a sunburn.

c) If a person has a sunburn, find the probability that they are female.

11) A meat packaging plant’s manager knows that there are 50 good packages of meat and 5 bad ones. If a meat inspector comes in and randomly picks 6 packages; (round to four decimal places.)

a) Find the probability that they are all good.

b) Find the probability that exactly one is bad.

c) Find the probability that at least one is bad.

d) Find the probability that all six are bad.

12) 15 children toss a coin one after another in alphabetical order (by their last name). The first two turn up heads. Find the probability that the third one is a tail. (fraction form)

13) The probability of winning a game is \( \frac{13}{4} \), find the odds of losing. (There are no ties)

14) The probability that it rains today is 40%. The probability that my car will start today is 75%. Which one of the following is guaranteed to be true.

A) It is guaranteed that one of the two events will happen.

B) If they are independent events, the probability that at least one happens is 85%.

C) If they are dependent, then the probability that they both happen is 32%.

D) The earth will explode.

15) Use the chart below to answer the questions. The chart represents a sample of male and female voters, and the presidential candidates that they voted for. (3 dec. places)

<table>
<thead>
<tr>
<th></th>
<th>Williams</th>
<th>Johnson</th>
<th>Mudd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>16</td>
<td>22</td>
<td>54</td>
</tr>
<tr>
<td>Female</td>
<td>36</td>
<td>24</td>
<td>18</td>
</tr>
</tbody>
</table>

a) Find the probability that a male voter voted for Mudd.

b) Find the probability that a person that voted for Mudd was male.

c) Find the probability that a voter selected at random was female.

d) Find the probability that a voter selected at random voted for Williams.

e) Are the events in parts c and d independent? (YES or NO)