

1.) A local company is interested in supporting environmentally friendly initiatives such as carpooling among employees. The company surveyed all of the 200 employees at the downtown offices. Employees responded as to whether or not they own a car and to the location of the home where they live. The results are shown in the table below.

		Location of Home			
		Downtown Area In the City	Elsewhere In the City	Outside the City	Total
Car Ownership	Yes	10	15	35	60
	No	60	55	25	140
	Total	70	70	60	200

a. What is the probability that an employee owns a car?

$$\frac{60}{200}$$

b. What is the probability that an employee lives in the "Downtown Area In the City"?

$$\frac{70}{200}$$

c. What is the probability that a person owns a car *and* lives in the "Downtown Area In the City"?

(∩) Intersection

$$\frac{10}{200}$$

d. What is the probability that a person owns a car *or* lives in the "Downtown Area in the City"?

"OR"  
"Union"

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

$$P(\text{Car} \cup \text{Down}) = P(\text{Car}) + P(\text{Down}) - P(\text{Car and Down})$$

$$= \frac{60}{200} + \frac{70}{200} - \frac{10}{200}$$

$$= \frac{120}{200}$$

e. Given that a person lives "Outside the City", what is the probability that they own a car.

new total

$$P(\text{Car} | \text{outside}) = \frac{35}{60}$$

2.) A Gallup survey asked 1005 U.S. adults who they think better fits their idea who should be President.

	Age Group				
	18 – 29	30 – 49	50 – 64	Over 65	TOTAL
Clinton	135	158	79	65	437
Trump	77	237	112	92	518
No opinion	5	21	14	10	50
TOTAL	217	416	205	167	1005

If we select a person at random from this sample:

a. What is the probability that they thought Trump should be President?

$$\frac{518}{1005}$$

b. What is the probability that the person is in the 50 – 64 age group?

$$\frac{205}{1005}$$

c. What is the probability that they are in the 50 – 64 age group *and* think Trump should be President?

$$\frac{112}{1005}$$

d. What is the probability that they are in the 50 – 64 age group *or* think Trump should be President?

$$\frac{205}{1005} + \frac{518}{1005} - \frac{112}{1005} = \frac{611}{1005}$$

e. Given that the person picked Clinton, what is the probability that the person is 18 – 29 yrs. old ?

$$\frac{135}{437}$$

f. Given that the person is 18 – 29 yrs. old, what is the probability that they chose Clinton?

$$\frac{135}{217}$$

g. If the person picked Trump, what is the probability that they are over 65?

$\Rightarrow$   
given in disguise

$$\frac{92}{518}$$