As in the class notes, a survey is conducted and tabulated below.

		Bloo d	Type		Total
Ethnic Group	O	A	B	A B	
G1	225	250	200	50	725
G2	800	75	100	25	1000
G3	150	350	125	60	685
Total	117 5	675	425	13 5	2410

A person from this survey is chosen at random. Answer the questions below. **Do not reduce the fractions!!**

1. P(G1)

2. P(Type A Blood)

3. P(Type B Blood ♥ G3)

4. P(G1 ♥ Type AB Blood)

5. P(Type A or Type O Blood)

1. Data is gathered from a university graduate program. Data is collected from each person applying to the program. Of the 400 male applicants, 100 were accepted. Of the 400 female applicants 60 were accepted.

	Not accepted	Accepted	Total
Male	300	100	
Female	340	60	
Total			

a) Determine P(Accepted | Male)

b) Determine P(Accepted | Female)

c) Comparing the answers in part a and b, do things seem a bit unfair at the university?

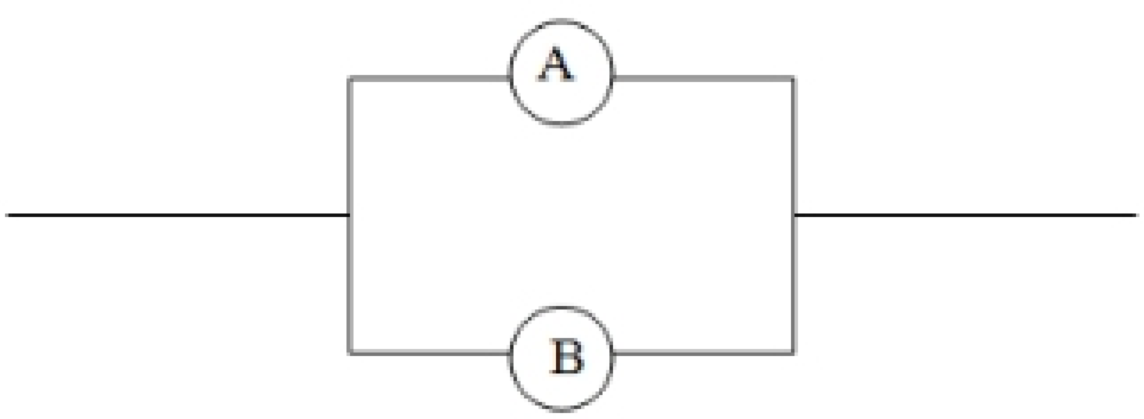
1. Suppose that it is known that a certain disease occurs in 1% of the population. Suppose also that we have a certain medical test to determine if person has this disease. The test produces a positive reading on 99.4% of those infected with the disease. Suppose that this test gives a positive result in healthy patients 2% of the time.
Assume we have 100,000 random individuals that follow the above information perfectly.

a) Fill in the table.

	Has Disease	Does Not Have Disease	Total
Test Positive			
Test Negative			
Total			100000

b) Determine $P(\text{Have the Disease} \mid \text{Tested Positive})$

c) Determine $P(\text{Have the Disease} \mid \text{Tested Negative})$



2. Determine the probability that the above circuit will work given the component (works) probabilities.

a) $P(A) = .85 \quad P(B) = .71$

b) $P(A) = .92 \quad P(B) = .98$

c) $P(A) = .65 \quad P(B) = .84$

1. Use the pmf to determine the mean of the random variable X.

a)

x	1	2	3	4	5	6	7	8
f (x)	.05	.15	.15	.25	.05	.15	.1	.1

b)

x	2	4	6	8	10	12	14	16
f (x)	.02	.04	.04	.12	.14	.14	.15	.35

2. Suppose that our company performs DNA analysis for a law enforcement agency. We currently have 2 machines that are essential to performing the analysis. When an analysis is performed, the machine is in use for the entire day. Thus, we can perform at most two DNA analyses per day. Based on past experience, the distribution of analyses needing to be performed on any given day are as follows:

Jobs	0	1	2	3	4	5 or more
f(x)	.08	.12	.21	.24	.21	.14
x						
xf(x)						

On days with three or more available jobs to perform, since we cannot perform more than two, the law enforcement agency gives the extra jobs to our competitor.

We are considering purchasing a third machine. Each day that the machine is in use, we profit $900. What is the yearly expected value of this new machine? (Assume 365 days per year – no weekends or holidays)

a) Determine the expected value per day of the third machine for the entire year.

b) Determine the expected value of adding a fourth machine for the entire year.

Jobs	0	1	2	3	4	5 or more
f(x)	.08	.12	.21	.24	.21	.14
x						
xf(x)						