Quiz Tues March 26   Section 6.3

Test 4
Wed April 3
5.2-5.4, 6.1-6.4, 8.1-8.3
  (8 Questions)
Practice Problems on website
Formula sheet will be provided
Bring calculator

Test Review
Thurs March 28

8.2 Classical Probability Cont'd

Algebra Review

$$\frac{8+7}{5} = \frac{(8+7)}{5} = 3$$

Ex: Find the mean of the population:

$$17, 29, 11$$

$$\mu = \frac{17+29+11}{3}$$

$$= \frac{(17+29+11)}{3}$$

$$= 19$$

Ex: Three people (call them A, B, C) stand in a row. Find the probability that:

a) C is on the left

All possible outcomes:
ABC, ACB, BAC, BCA, CAB, CBA

$$P(C \text{ is on the left}) = \frac{2}{6}$$

b) A is not on the right

$$\frac{4}{6}$$

Ex: Students are surveyed:

	Like Coffee	Dislike Coffee
Like Spicy Food	13	5
Dislike Spicy Food	2	4

Find the probability that a random student:

a) likes coffee

Total # of outcomes = $13 + 5 + 2 + 4 = 24$

$$P(\text{likes coffee}) = \frac{13+2}{24}$$

$$= \frac{15}{24}$$

b) dislikes spicy food

$$\frac{6}{24}$$

c) likes spicy and dislikes coffee

$$\frac{5}{24}$$

d) likes spicy or likes coffee

$$\frac{13+5+2}{24} = \frac{20}{24}$$

Ex: In a class of 45 students, 26 have jobs and 17 have cars. Of those who don't

have a car, 10 have jobs.

a) Fill in the table:

	J	$\bar{J}$
C		
$\bar{C}$		10

	J	$\bar{J}$
C	16	
$\bar{C}$	10	

16 ← 26−10

	J	$\bar{J}$
C	16	1
$\bar{C}$	10	

1 ← 17−16

	J	$\bar{J}$
C	16	1
$\bar{C}$	10	18	← (45 − 16 − 1 − 10)

b) P(car but not a job) ?

and →

$$\boxed{\frac{1}{45}}$$

c) P(car or job) ?

$$\frac{16 + 1 + 10}{45} = \frac{27}{45}$$

EX: A fair 20-sided die is rolled. Find the probability that the roll

is odd and greater than 12.

Possible outcomes: 1, 2, ..., 20

Desired outcomes = 13, 15, 17, 19

$$\frac{4}{20}$$

8.2 #3

3. An individual is presented with three different glasses of soft drink, labeled A, B, and C. He is asked to taste all three and then list them in order of preference. Suppose that the same soft drink has actually been put into all three glasses.

(a) How many outcomes are there in this experiment? What probability would you assign to each one?

(b) What is the probability that A is ranked first?

(c) What is the probability that either B or C is ranked first?

(d) What is the probability that A is ranked first and B is ranked last?

a) Possible outcomes:

ABC, ACB, BAC, BCA, CAB, CBA

$$\boxed{6}$$

Each outcome has probability $\frac{1}{6}$.

9. StatsCan surveyed one hundred Canadians and found that 60 of them exercise regularly, 75 of them eat healthy diets, and 45 of them do both. Complete the following contingency table using the above information

	exercise regularly	don't exercise regularly	total
healthy diet			
unhealthy diet			
total			

(a) If one of these Canadians is selected randomly, what is the probability that this person exercises regularly but does not eat a

	E	$\bar{E}$
H	$45 \rightarrow 30$	
$\bar{H}$	$\downarrow$ 15	

	E	$\bar{E}$
H	45	30
$\bar{H}$	15	10

8.2 Exercises

healthy diet?

(b) If one of these Canadians is selected randomly, what is the probability that this person exercises regularly or eats a healthy diet?

8.3 Discrete Random Variables

__Random variable__: Assigns a #
to each outcome of an experiment.

e.g. $X =$ # of heads that
appear in 3 coin tosses.

__Probability Distribution__: A table
that lists the values of X
and their probabilities.

__Ex__: $X =$ # of heads that appear
in 3 coin tosses.

HHH
THH
HTH
HHT
TTH
THT
HTT
TTT

X	$P(X)$
0	0.125
1	0.375
2	0.375
3	0.125

} probability distribution

Ex: An unfair die has a $\frac{1}{9}$ chance of rolling a 1, a $\frac{2}{9}$ chance of rolling a 6, and a $\frac{1}{6}$ chance of rolling any other #.

Let X = the number rolled.

Find the probability distribution.

table

X	P(X)
1	$\frac{1}{9}$
2	$\frac{1}{6}$
3	$\frac{1}{6}$
4	$\frac{1}{6}$
5	$\frac{1}{6}$
6	$\frac{2}{9}$

FACT

In a probability distribution, the probabilities sum to 1.

(100%)

Ex: Is it a probability
distribution?

X	P(X)
1	0.3
2	0.4
3	0.15
4	0.1

$0.3 + 0.4 + 0.15 + 0.1 = 1$?

No

Ex: Find k so that
it is a probability
distribution:

X	P(X)
0	0.36
1	k
2	0.29

$$0.36 + k + 0.29 = 1$$
$$k + 0.65 = 1$$
$$k = 0.35$$

Countable number of values

2

Probability for (Discrete Variables)

If all outcomes are equally likely

If all outcomes are not equally likely

List all possible outcomes

OR

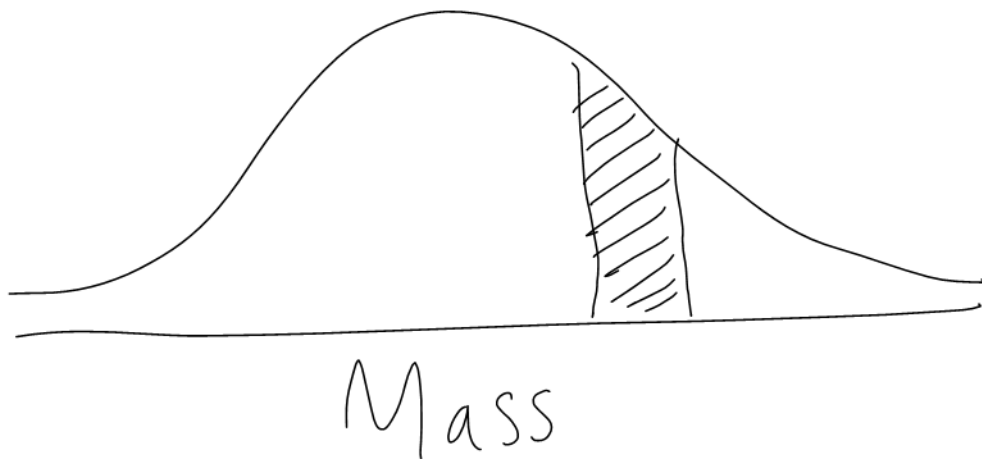|	Car	No Car
Job	#	#
No Job	#	#

(Section 8.2)

Probability Distribution
(Section 8.3)

Probability for Continuous Variables (Ch 9)

infinitely-many decimal places

Probability is area under a curve.

Mass

We'll use a web-based calculator to compute probabilities.

Ex: Is the variable discrete or continuous?

a) the mass of a textbook (kg)

CONTINUOUS
Could be 3,5186... kg

b) the cost of a textbook ($)

DISCRETE
Gaps between possible values.

c) the number of eggs a hen lays

DISCRETE

d) the amount of milk a cow produces (L)

CONTINUOUS