QUESTIONS ON
Homework

Start the warm up.

Be sure to have out your formula sheet today.

The table below shows the number of left and right handed tennis players in a sample of 50 males and females.

	Left handed	Right handed	Total
Male	3	29	32
Female	2	16	18
Total	5	45	50

If a tennis player was selected at random from the group, find the probability that the player is

(a) male and left handed;

(b) right handed;

(c) right handed, given that the player selected is female.

1. The table below shows the number of left and right handed tennis players in a sample of 50 males and females.

	Left handed	Right handed	Total
Male	3	29	32
Female	2	16	18
Total	5	45	50

original Sample Space = 50

If a tennis player was selected at random from the group, find the probability that the player is

(a) male and left handed; 3/50

(b) right handed; 45/50

(c) right handed, given that the player selected is female.

$\frac{16}{18}$ ← reduced sample space

(a) Represent the above information on a Venn Diagram.

(b) How many children drank none of the above?

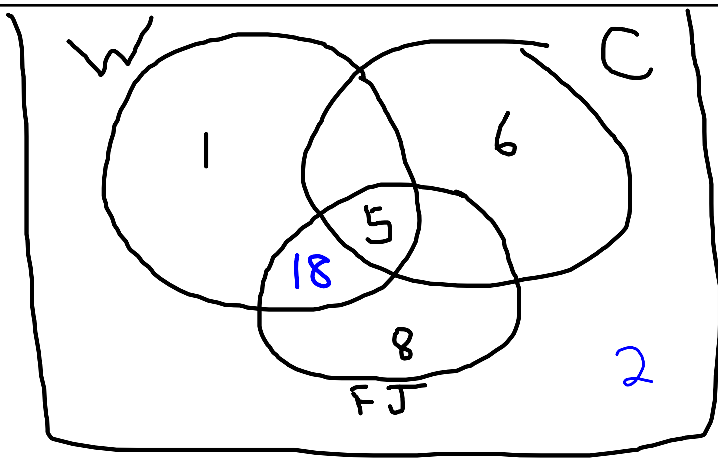
(c) A child is chosen at random. Find the probability that the child drank

(i) coffee;

(ii) water or fruit juice but not coffee;

(iii) no fruit juice, given that the child did drink water.

(d) Two children are chosen at random. Find the probability that both children drank all three choices..



Represent the above information on a Venn Diagram.

How many children drank none of the above? 2

A child is chosen at random. Find the probability that the child drank

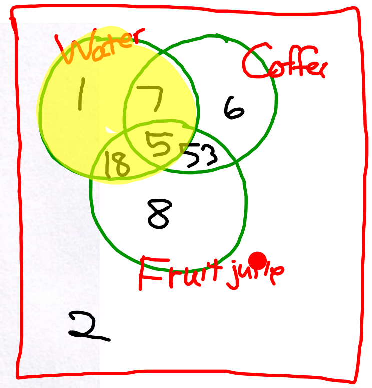
(i) coffee;

(ii) water or fruit juice but not coffee;

(iii) no fruit juice, given that the child did drink water.

Two children are chosen at random. Find the probability that both children drank all three choices..

Represent the above information on a Venn Diagram.



How many children drank none of the above? 2

A child is chosen at random. Find the probability that the child drank

(i) coffee; $\frac{71}{100}$

(ii) water or fruit juice but not coffee; $\frac{27}{100}$

(iii) no fruit juice, given that the child did drink water. $\frac{8}{31}$

Two children are chosen at random. Find the probability that both children drank all three choices..

$$\frac{5}{100} \cdot \frac{4}{99} = \frac{20}{9900} = \frac{2}{990} = \frac{1}{495}$$

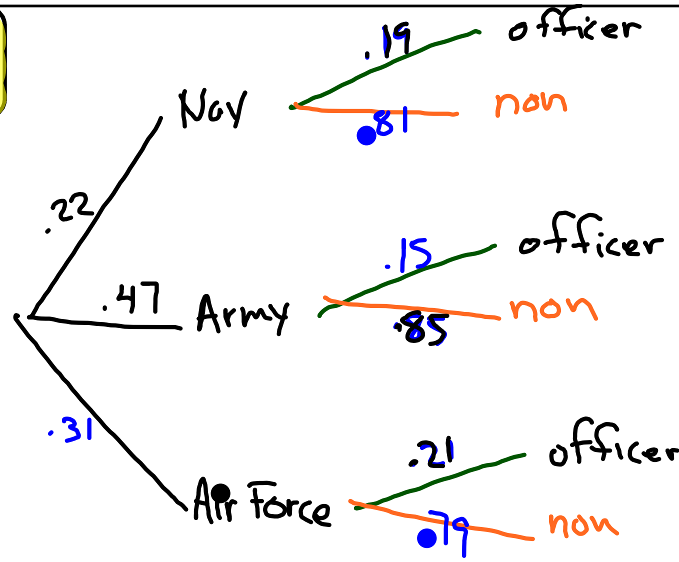
.002

or 0.2 %

Look at the HW solutions

Then let me know if you want me to go over any.

p. 474
#5

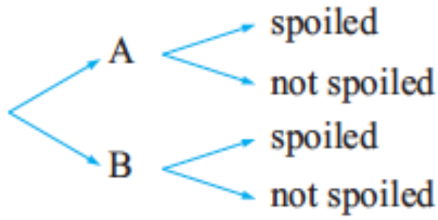


i) P(not officer)

iii) (not an army or air force)

p. 474
#7

Machine A makes 40% of the bottles produced at a factory. Machine B makes the rest. Machine A spoils 5% of its product, while Machine B spoils only 2%. Determine the probability that the next bottle inspected at this factory is spoiled.

Hint:


p. 478
#2

5 tickets (1, 2, 3, 4, 5)

a) P(both odd)

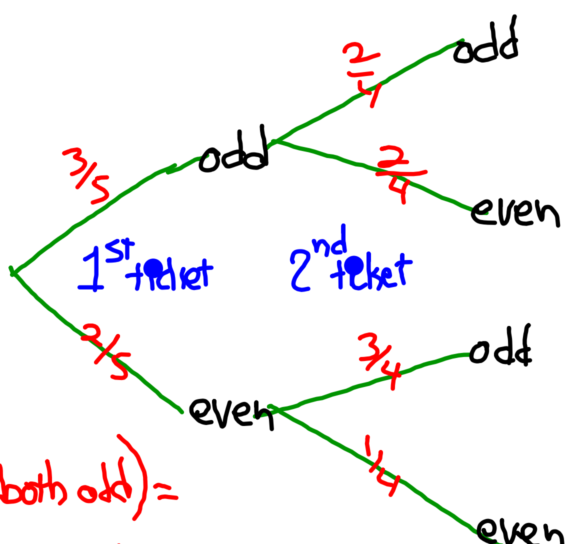
b) P(both even)

c) P(one of each)

= P(odd/even or even/odd)

=

5 tickets (1, 2, 3, 4, 5)



a) P(both odd) =

b) P(both even) =

c) P(one of each) =

p478 #

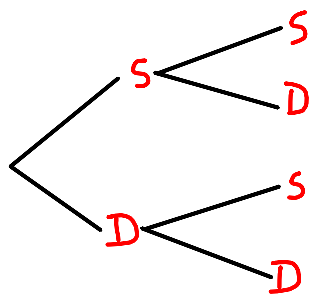
A cook selects an egg at random from a carton containing 6 ordinary eggs and 3 double-yolk eggs. She cracks the egg into a bowl and sees whether it has two yolks or not. She then selects another egg at random from the carton and checks it.

Let S represent "a single yolk egg" and D represent "a double yolk egg".

a Draw a tree diagram to illustrate this sampling process.

b What is the probability that both eggs had two yolks?

c What is the probability that both eggs had only one yolk?



p482_3

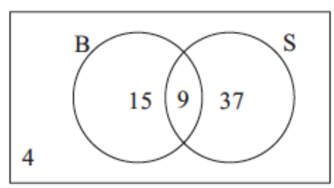
3 In a survey at an alpine resort, people were asked whether they liked skiing (S) or snowboarding (B). Use the Venn diagram to determine the number of people:

a in the survey

b who liked both activities

c who liked neither activity

d who liked exactly one of the activities.



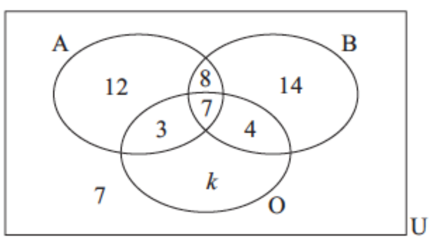
Day 4 Prob Laws October 24, 2017

Pg 482 #4

In a class of 40 students, 19 play tennis, 20 play netball and 8 play neither of these sports. A student is randomly chosen from the class. Determine the probability that the student:

- **a** plays tennis
- **b** does not play netball
- **c** plays at least one of the sports
- **d** plays one and only one of the sports
- **e** plays netball, but not tennis
- **f** plays tennis knowing he/she plays netball.

Pg 482 #8



In the Venn diagram, U is the set of all members of a gymnastic club.

The members indicate their liking for apples (A), bananas (B) and oranges (O). There are 60 members in the club.

- **a** Find the value of k.
- **b** If a randomly chosen member is asked about their preferences for this fruit, what is the probability that the member likes:
  - **i** only bananas
  - **ii** bananas and oranges
  - **iii** none of these fruit
  - **iv** at least one of these fruits
  - **v** all of the fruits
  - **vi** apples and bananas, but not oranges
  - **vii** oranges or bananas
  - **vii** exactly one of the three varieties of fruit

Schedule:

Tues Finish prob --- Start review

Wed Review

Thurs Test on Sets, Venn D, Probability

Tues Introductory Differential Calculus

Today

1. Look at the last of the probability laws. You will be given a paper to take notes on.

We will also point out the laws on the IB formula sheet.

2. Do some related problems in class.

Laws of Probability

We already know:

$\cup$ means "or"

$\cap$ means "and"

$$P(A \cup B) =$$
$$= P(A\underline{or}B)$$

$$P(A \cap B) =$$
$$= P(AandB)$$

The Law For:

Indendent Events:

(if one event does not affect the other)

$$P(A \cap B) = P(A) \bullet P(B)$$

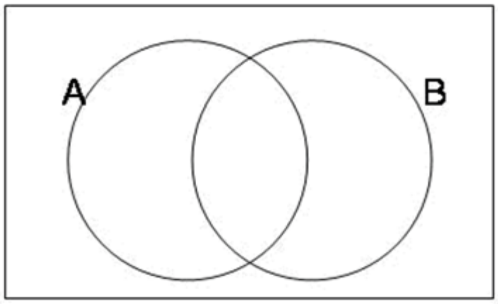
find the

Law of Combined Events
on your formula sheet

The Law for Combined Events:

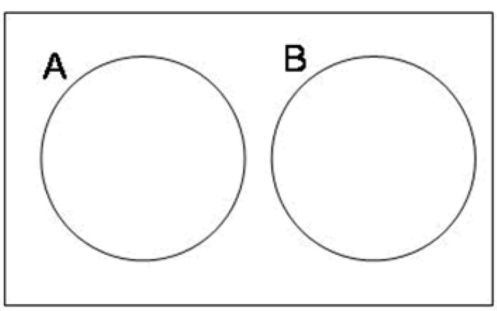
$$P(A or B) = P(A) + P(B) - P(A and B)$$

$n(A \text{ or } B) = n(A)$



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

Unless, of course, the events are **Mutually Exclusive** from each other.

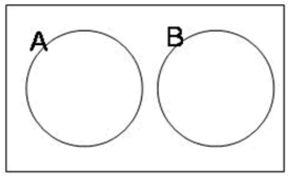


That is....Events A and B have no chance of overlap.

For example:

A: The child has blue eyes

B: The child has brown eyes.



In this case, the Combined Events Law simplifies to:

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

3.6	Probability of an event A	$\mathrm{P}(A) = \dfrac{\text{number of outcomes in } A}{\text{total number of outcomes}}$
	Complementary events	$\mathrm{P}(A') = 1 - \mathrm{P}(A)$
3.7	Combined events	$\mathrm{P}(A \cup B) = \mathrm{P}(A) + \mathrm{P}(B) - \mathrm{P}(A \cap B)$ ✓
	Mutually exclusive events	$\mathrm{P}(A \cap B) = 0$
	Independent events	$\mathrm{P}(A \cap B) = \mathrm{P}(A)\,\mathrm{P}(B)$ ✓
	Conditional probability	$\mathrm{P}(A \mid B) = \dfrac{\mathrm{P}(A \cap B)}{\mathrm{P}(B)}$ ← reduced sample space

Abstract

back of the Warm Up

Example 1

$P(A)=0.6$

$P(A \cup B)=0.7$

$P(A \cap B)=0.3$

find P(B)

$P(A \cup B) = P(A) \cdot P(B)$

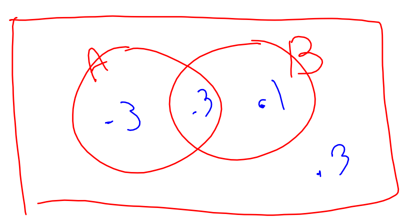
Using Laws $P(A \cup B) = P(A) + P(B) - P(A \text{ and } B)$

$.7 = .6 + P(B) - .3$

$.7 = .3 + P(B)$

$P(B) = .4$

or Using Venn Diagrams



Example 2

A box of chocolates contains 6 with mint filling (M) and 12 with no filling (N).

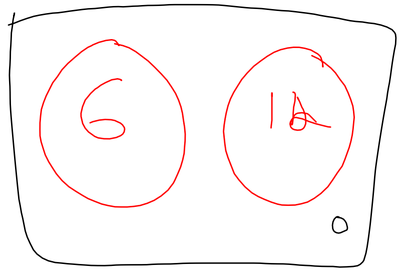
Find

i. P(M) $\frac{6}{18}$

ii. P(N) $\frac{12}{18}$

iii. $P(M \cap N)$ 0

iv. $P(M \cup N)$ $\cancel{18}$ 1



Conditional Probability

A | B is used to represent that A occurs knowing that B has occurred.

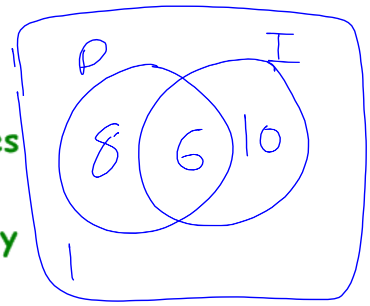
$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

reduced sample space

An example on the next page will show how our last and final probability law works.

Example 3

In a class of 25 students, 14 like Pizza and 16 like iced coffee. One student likes neither and 6 like both. One student is randomly selected. What is the probability that the student:



a. likes pizza ? $\frac{14}{25}$

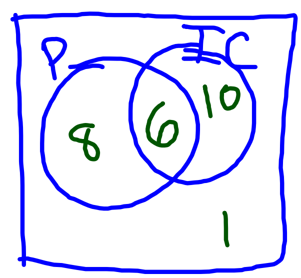
b. likes pizza given that she likes iced coffee. $= \frac{6}{16}$

$$P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{6}{16}$$

pizza

Example 3

In a class of 25 students, 14 like Pizza and 16 like iced coffee. One student likes neither and 6 like both. One student is randomly selected. What is the probability that the student:



a. likes pizza ?

b. likes pizza given that she likes iced coffee.

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

Group Problem

Events A and B have the following probabilities:

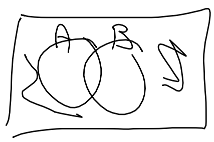
$p(A) = 0.4 \qquad p(B) = 0.5 \qquad p(A \cup B) = 0.7$

a. Calculate $p(A \cap B)$ $= .2$

b. Represent this information on a Venn diagram

c. Find $P(A' \cap B')$ $= .3$

d. Are the events A and B independent ?



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

$.7 = .4 + .5 - P(A \cap B)$

$.7 = .9 - P(A \cap B)$

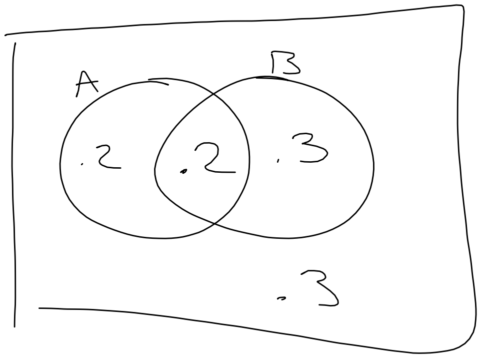
$\therefore P(A \cap B) = .2$

$P(A \cap B) \stackrel{?}{=} P(A) \cdot P(B)$

$.2 \stackrel{?}{=} (.4)(.5)$

$.2 = .2$

A and B are independ.



There is not a lot of time to practice these most recent topics, so don't rush through tonight's assignment.

B _ _ _ _ B _ _ _ _

US States Renamed
For Countries With Similar
GDPs


Turkey
Tunisia
Ecuador
Norway
Dominican Rep.
Moroco
Bangladesh
Belgium
Israel
Ukraine
Croatia
So. Africa
Argentina
Brazil
Uzbekistan
Vietnam
Greece
Russia
Netherlands
Czech Republic
Venezuela
Australia
Romania
Ireland
Peru
Finland
Mexico
Denmark
Algeria
Hong Kong
Austria
France
Malaysia
Poland
Portugal
New Zealand
Saudi Arabia
Sweden
Thailand
Philippines
Pakistan
Singapore
Hungary
Chile
Iran
Switzerland
Canada
Indonesia
Korea Republic
Nigeria
Belarus

Partner

LCQ

Assignment

p. 486 .... 2, 6, 8, 11

p. 490........ 1-3

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