

Welcome to MAT137 “Calculus with Proofs”

- Course website: Quercus and <http://www.math.toronto.edu/khesin/teaching/mat137.html>
- Read the course syllabus!
- Save test dates: tentatively Oct 21 (F), Dec 2 (F), Feb 10 (F), and March 24 (F); 4-6pm.
- Online forum – piazza
- Enrol in a tutorial!
- **Before next class, watch videos 1.1, 1.2, 1.3.**

How did students do in MAT137 in previous years?

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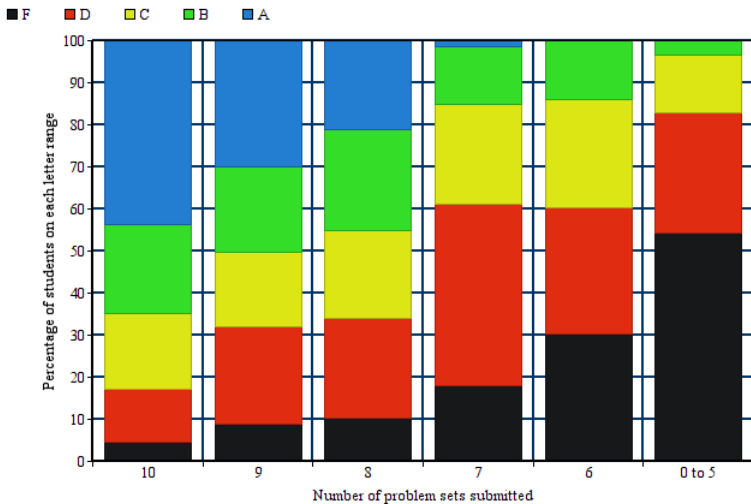
It depends on how many problem sets they submitted.

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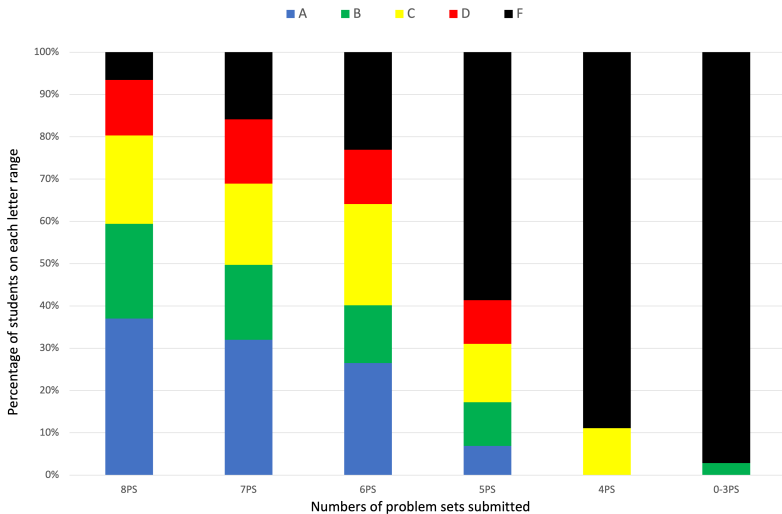
It depends on how many problem sets they submitted.

In those old-old times, when there were 10 assignments
instead of 8...

Performance in MAT137Y as a function of problem sets submitted (2017-2018)



Performance in MAT137Y depending on number of problem sets submitted(2021-2022)



Quick exercise

Take 45 seconds to look over the following list of pairs of words, but **do not write anything down**.

bread/b_tter	ocean/breeze
leaf/tree	music/l_rics
sweet/sour	sh_e/sock
phone/bo_k	movie/actress
chi_s/salsa	gasoline/engine
high school/college	pen_il/paper
river/b_at	turkey/stuffing
fruit/vegetable	be_r/wine
computer/chip	television/rad_o
l_nch/dinner	chair/couch

What do you remember?

Write down as many pairs of words as you can.

You do *not* need to remember which letters were missing or which column they were in.

What did you remember?

Mark each pair you remembered as “A” or “B”

A	B
ocean/breeze	bread/b_tter
leaf/tree	music/l_rics
sweet/sour	sh_e/sock
movie/actress	phone/bo_k
gasoline/engine	chi_s/salsa
high school/college	pen_il/paper
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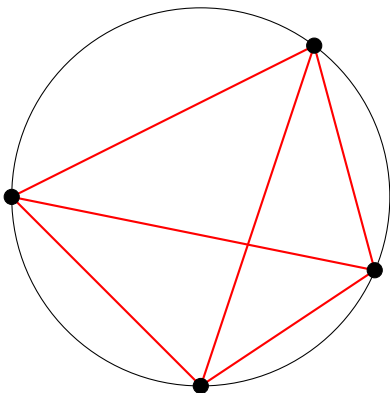
Table: Word list from [The Talent Code](#) (by Daniel Coyle).

Why?

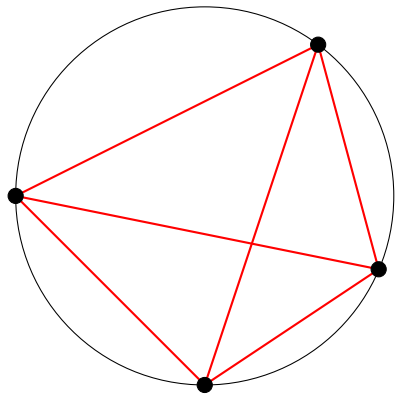
Most of you guessed more B-words than A-words.
Why do you think this happened?

A warm-up problem

- Pick 4 points at random on a circle.
- Join every pair of points.
- In how many regions is the circle divided?

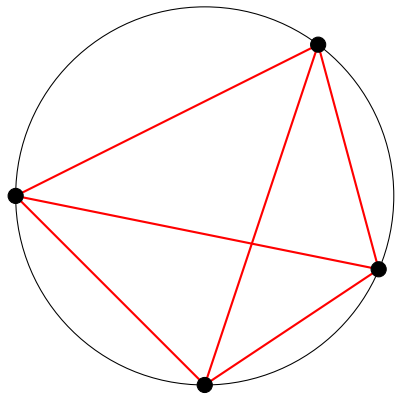


A warm-up problem



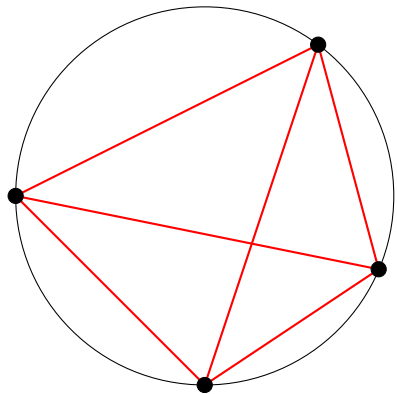
# of points	# of regions
4	8
5	

A warm-up problem



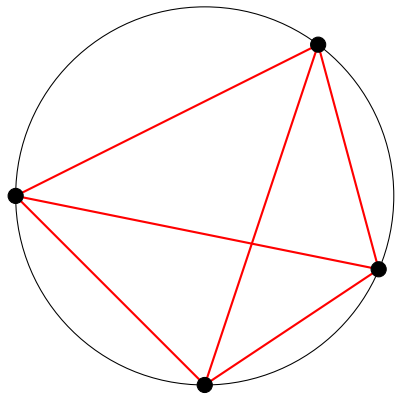
# of points	# of regions
4	8
5	16

A warm-up problem



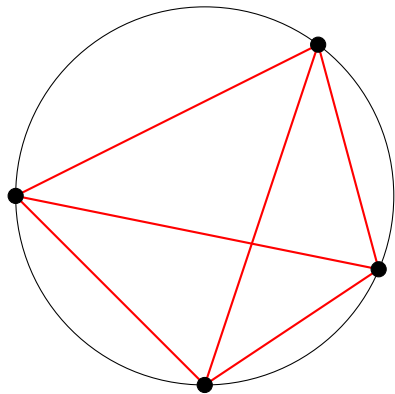
<u># of points</u>	<u># of regions</u>
1	
2	
3	
4	8
5	16

A warm-up problem



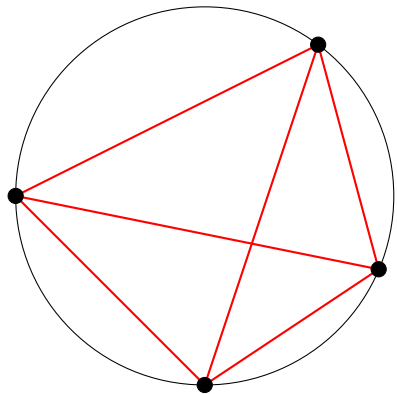
# of points	# of regions
1	1
2	2
3	4
4	8
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A warm-up problem



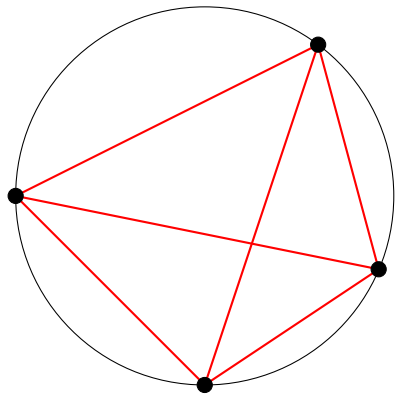
# of points	# of regions
1	1
2	2
3	4
4	8
5	16
6	
N	

A warm-up problem

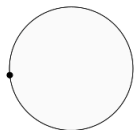


# of points	# of regions
1	1
2	2
3	4
4	8
5	16
6	31
N	

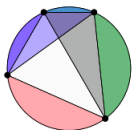
A warm-up problem



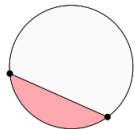
# of points	# of regions
1	1
2	2
3	4
4	8
5	16
6	31
N	???



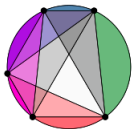
$$n=1, c=0, r_G=1$$



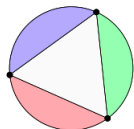
$$n=4, c=6, r_G=8$$



$$n=2, c=1, r_G=2$$



$$n=5, c=10, r_G=16$$



$$n=3, c=3, r_G=4$$



$$n=6, c=15, r_G=31$$

The number of points (n),
chords (c) and regions (r_G)
for the first 6 terms of
Moser's circle problem

Which of the following statements is the negation of the statement

“Every person in Toronto is wearing a black shirt today.”

1. “No person in Montreal will wear a white shirt tomorrow.”
2. “All people in Toronto are wearing a shirt which is not black today.”
3. “Today, someone in Toronto is wearing a shirt which is not black.”
4. “Yesterday, someone in Toronto wore a white shirt.”
5. “Today, everyone in Toronto is wearing a shirt which is not black.”

Write the negation of these statements as simply as possible:

1. Every student at U of T has a backpack.
2. There is a country in the European Union with fewer than 1000 inhabitants.
3. All of my friends like apples.
4. I like apples and bananas.
5. All of my friends like apples and bananas.

More negation

Write the negation of this statement without using any negative words (“no”, “not”, “none”, etc.):

“Every page in this book contains at least one word whose first and last letters both come alphabetically before M.”