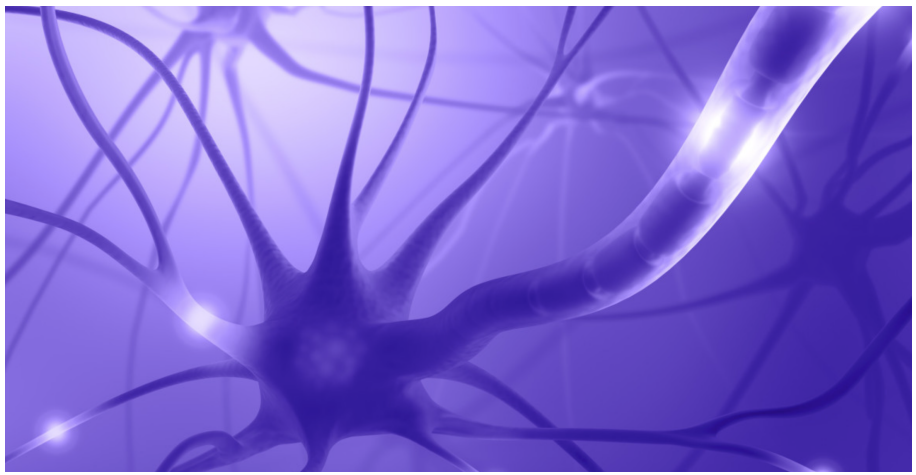
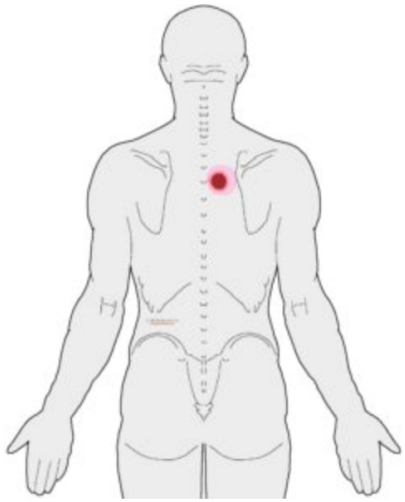
Mathematics In Pain

Mohamed Omar

Harvey Mudd College

MAA SoCal/Nevada Sectional Meeting
April 29, 2017





There is a personal struggle at the forefront of our minds above everything else.

Teaching Differently

I need to teach but it hurts to:

- Write on paper
- Type on keyboards
- Write on chalkboards or whiteboards

Response:

Teaching Differently

I need to teach but it hurts to:

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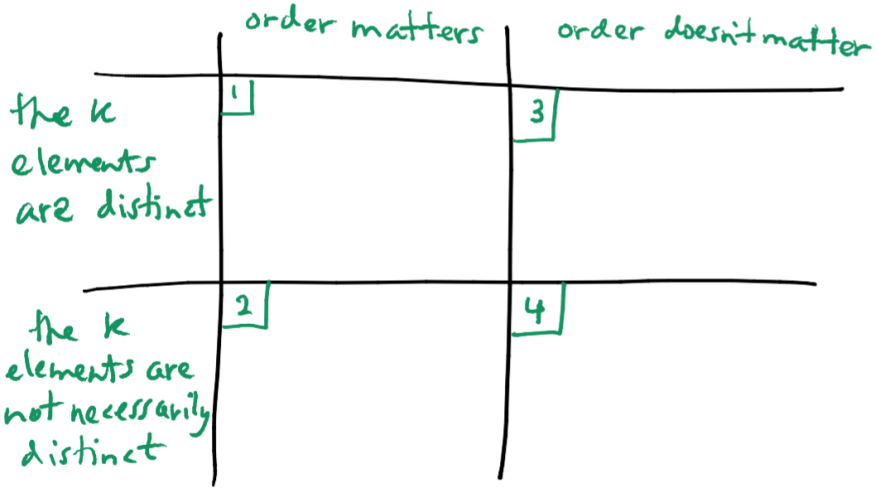
Response: **AAAAHHH!!!!**

Teaching Differently: Handouts

Last Time:

The number of ways to select k-elements from an n-element set is:



Today: We will fill in box ___.

Teaching Differently: Handouts

Last Time:

	order matters	order doesn't matter
the k elements are distinct	$\frac{n!}{(n-k)!}$	$\binom{n}{k} = \frac{n!}{k!(n-k)!}$
the k elements are not necessarily distinct	n^k	$\binom{n+k-1}{n-1}$

Teaching Differently: Handouts

Example. Suppose random variables X, Y having joint distribution given by

$$f_{X,Y}(x,y) = \frac{1}{162}xy^2, \quad 0 \leq x \leq 6, \ 0 \leq y \leq 3.$$

Are X, Y independent?

Teaching Differently: Handouts

Example. Suppose random variables X, Y having joint distribution given by

$$f_{X,Y}(x,y) = \frac{1}{162}xy^2, \quad 0 \le x \le 6, \ 0 \le y \le 3.$$

Are X, Y independent?

$$f_X(x) = \int_{-\infty}^{\infty} f_{X,Y}(x,y)\,dy = \int_0^3 \frac{1}{162}\cdot xy^2\,dy = \Big|_0^3 \frac{1}{162}\cdot x\cdot\frac{y^3}{3} = \frac{x}{18}.$$

$$f_Y(y) = \int_{-\infty}^{\infty} f_{X,Y}(x,y)\,dx = \int_0^6 \frac{1}{162}\cdot xy^2\,dx = \Big|_0^6 \frac{1}{162}\cdot\frac{x^2}{2}\cdot y^2 = \frac{y^2}{9}.$$

$$f_X(x)\cdot f_Y(y) = \frac{x}{18}\cdot\frac{y^2}{9} = \frac{1}{162}\cdot xy^2 = f_{X,Y}(x,y).$$

So they are independent.

Teaching Differently: Handouts

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$$f_Y(y) = \int_{-\infty}^{\infty} f_{X,Y}(x,y)\,dx = \int_0^6 \frac{1}{162}\cdot xy^2\,dx = \left|_0^6 \frac{1}{162}\cdot\frac{x^2}{2}\cdot y^2\right. = \frac{y^2}{9}.$$

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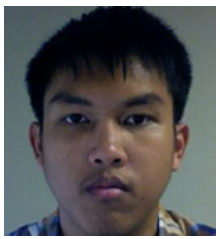
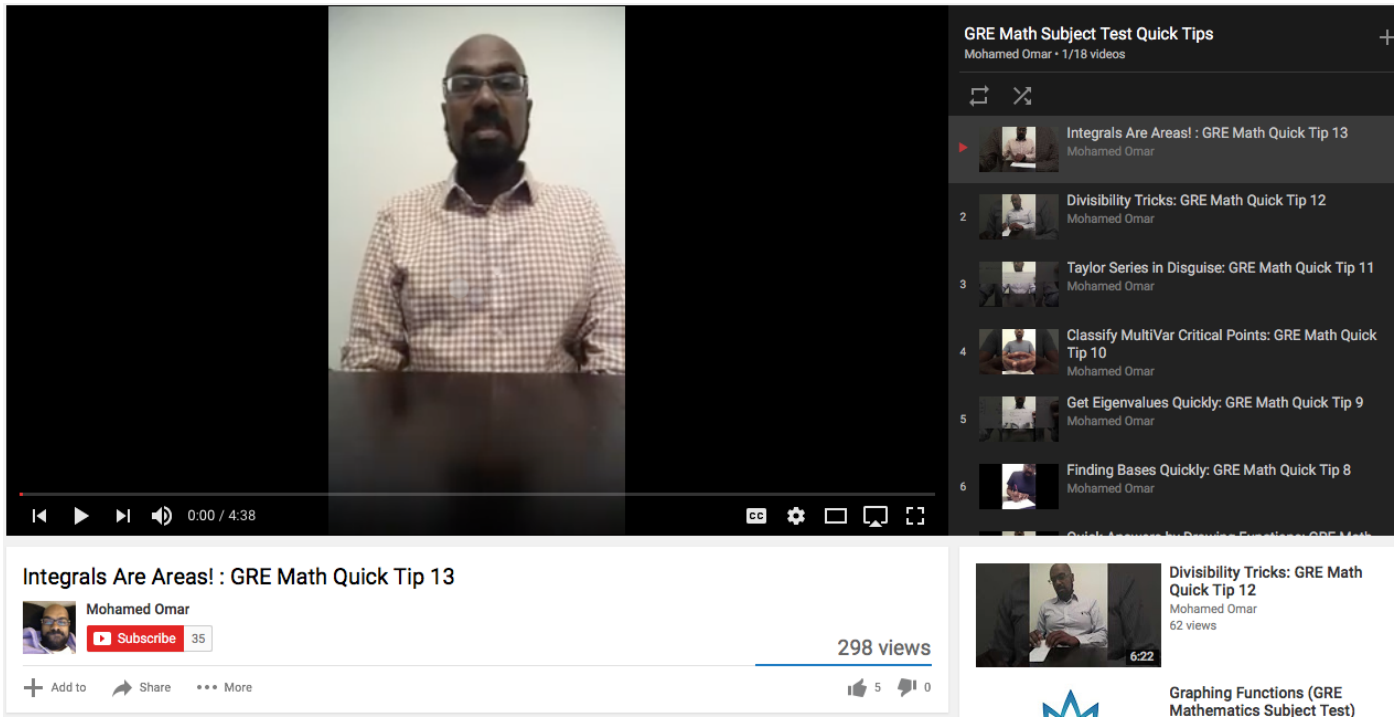


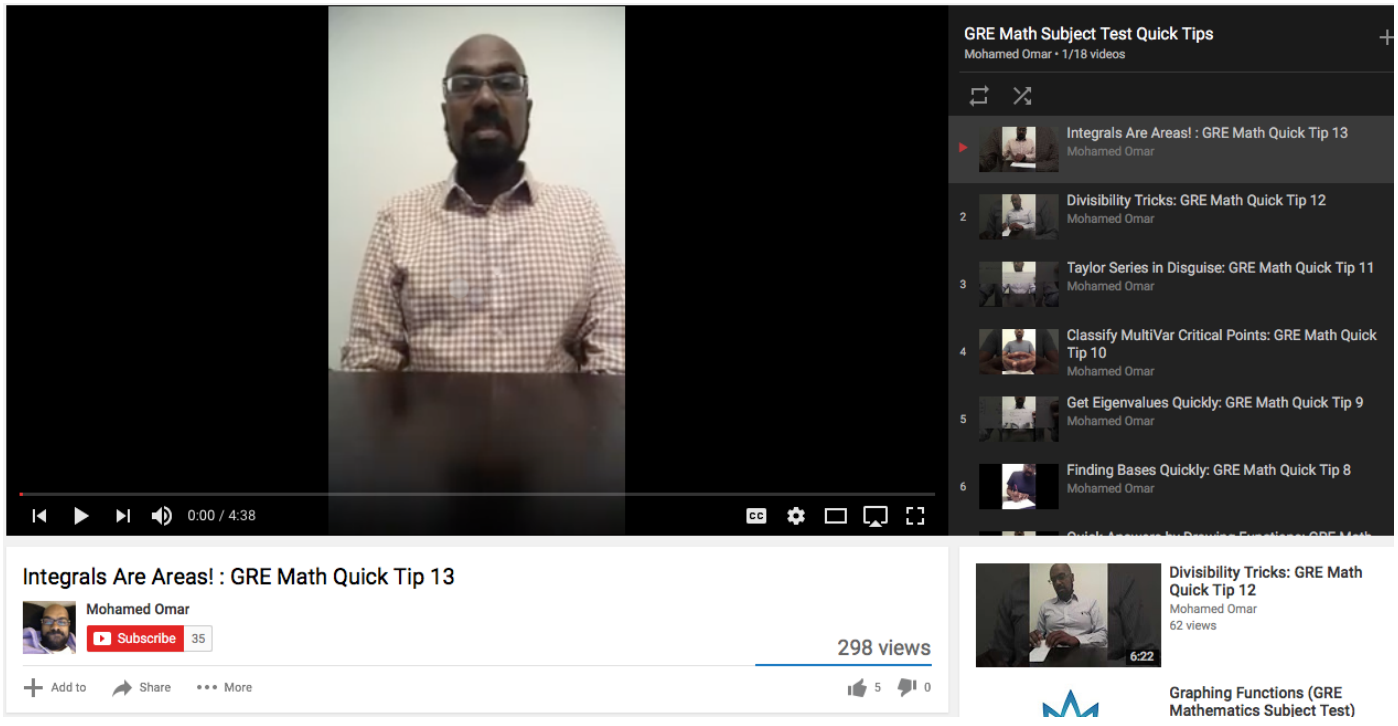
Teaching Differently: Videos

Prof. Candice Price, University of San Diego

Teaching Differently: Videos



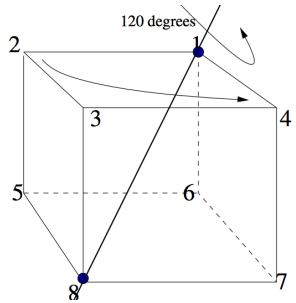
Teaching Differently: Videos

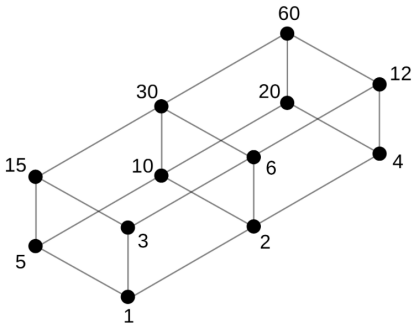


Google: "Mohamed Omar Math GRE"

Math 106

Combinatorics - Math 106





- Terminal course: mostly juniors
- Has proof-based course as a prerequisite
- Math and computer science majors

Teaching Differently: Student Experience

Gail Tang, University of La Verne

CCMS Colloquium: “The Creativity Rubric”

Rubric

Creativity in Progress Rubric (CPR) on Proving

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Gail Tang
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Emilie Naccarato
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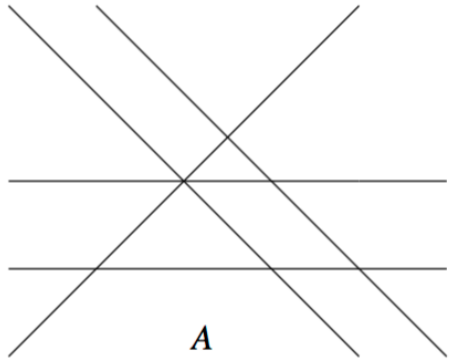
David Plaxco
University of Oklahoma
dplaxco@math.ou.edu

MAKING CONNECTIONS:	**Beginning**	**Developing**	**Advancing**
Between Definitions/Theorems	Recognizes some relevant definitions/theorems from the course or textbook with no attempts to connect them in their proving	Recognizes some relevant definitions/theorems from the course and attempts to connect them in their proving	Implements relevant definitions/theorems from the course and/or other resources outside the course in their proving
Between Representations[1]	Provides a representation with no attempts to connect it to another representation	Provides multiple representations and recognizes connections between representations	Provides multiple representations and uses connections between different representations
Between Examples	Generates one or two specific examples with no attempt to connect them	Generates one or two specific examples and recognizes a connection between them	Generates several specific examples and uses the key idea synthesized from their generation

Portfolio Problem



Determine the number of bounded and unbounded regions of a A-arrangement in terms of its intersection poset in as many of the following situations as you like:

1. $\mathcal{A}$ consists of V's in the plane; 3-space.
2. $\mathcal{A}$ consists of circles, no pair of which are tangent.
3. other geometric objects (example, varieties)

Collaborators

Gail Tang

Emili Cilli-Turner

Milos Savic

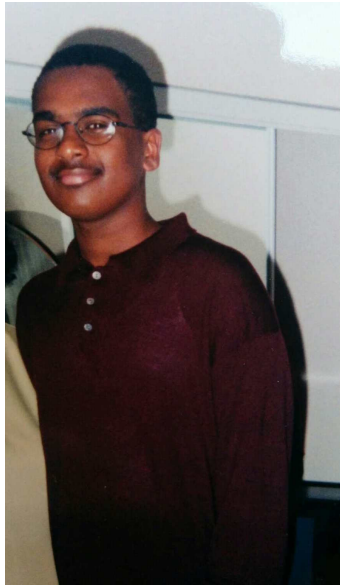
Houssein El-Turkey

Gulden Karakok

David Plaxco

STRUGGLE: GET HELP!

High School



- Navigate college application process
- Funded college through scholarships

College

- Missed classes
- Didn't attend office hours
- Didn't Ask For Help

College

- 4 graduate classes and elective
- Father had cancer
- Didn't Ask For Help

The Bad Term

- Grades sacrificed
- GRE Subject Test Score

The Bad Term

- Grades sacrificed
- GRE Subject Test Score
- Not accepted to **any** of the 9 graduate programs I applied to

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Response: **AAAAHHH!!!!**

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Response: ~~**AAAAHHH!!!!**~~ I NEED HELP!!!!!

Help Please!

Dean Groves

Prof. dePillis

Help Please!

Nora Youngs

Ivan Ventura

MORE Help Please!

Dean Groves

Prof. dePillis

Dragon!


Nuance
Dragon
NaturallySpeaking
Home
Speech recognition software
NUANCE

There is a personal struggle at the forefront of our minds above everything else.

Thanks!