

# Byrne Seminar, really exciting stuff!

## Wow, this is Experimental Math!!

### Incredibly difficult homework assignment #1

Please hand in one or more sheets of paper (if the number of pages is more than 1, please attach with staple or otherwise). Put your name on the pages in one or more obvious places. Please. Sigh.

Please don't spend more than ONE hour at most on this outside of class. If there is other stuff you should do or want to do, this "seminar" shouldn't be the reason there's a problem.

**Your (?) hard problem #0** Finish going over the handouts if this is needed and *if you have the time*. Do not spend more than 1 (one, 1, I) hour on this.

**Hard problem #1** Tell me a 10 digit prime number\*. It must have *exactly* 10 digits, please. Give me some evidence (you can "copy" the Maple commands and output) that your answer is correct.

**Hard problem #2** Here (read it carefully!) is a ludicrous polynomial in  $x$  and  $y$ :

$$\left( (1 + 2x^2)^5 - 3y^3 \right)^{10}$$

A) What is its top DEGREE (the total number of the exponent, in both  $x$  and  $y$ )?

B) One term in the polynomial, after it is EXPANDED, is a COEFFICIENT (a number) which multiplies  $x^{18}y^{15}$ . What is this coefficient? Please provide "evidence", such as Maple commands and outputs. Sigh.

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\* A positive integer is *prime* if it has no exact integer divisors other than itself and 1. So 17 is prime but 14 is not.