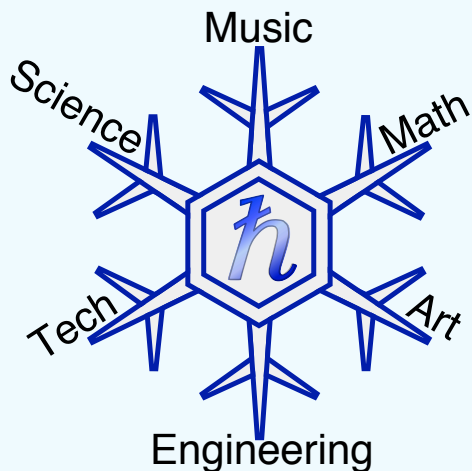


the \hbar palladium • a math+science newsletter

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www.HbarTutoring.com



Winter **Academy** STEAM² Schedule



Dates: January 15, 2016 to March 6, 2016

Days: Fridays, Saturdays, and Sundays

Classes: Full class list online at hbartutoring.com/Academy

Competition Math	Space Exploration	Botany
Conceptual Physics	Coding in Python	Geology
Physics Lab 2	Philosophy	Algebra Bootcamp
Math and Music	Musical Circuits	Electronics Lab

About Us

We are a small company of of MIT and Caltech alums passionate about math and science education. We aim for the minimum possible uncertainty. In other words:

$$\hbar \leq 2\Delta x \Delta p$$

Contact us

Drs. Rose and Ronnie

hbartutoring@gmail.com

626 - 375 - 0575

PO Box 60244
 Pasadena, CA 91106

Announcements

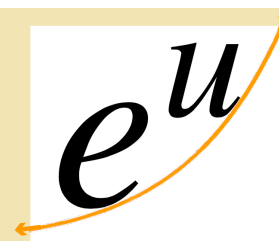
Small group **AP** review classes start March: *Calculus, Physics, Biology, Chemistry*. Email us to find out more!

Math Circle call for interest. Love math? Want to problem solve with others? Email us about starting a Math Circle in Pasadena!

Practice **SAT** in January: [Register](#) online now!

H-bar student **Gregory Eng** wins \$10,000 Nordstrom Scholarship! Congratulations! We wish you the best of luck in college!

Test release of our Algebra book **SIGMA VS PYTHON** available. If you would like an advance copy, let us know! We want your feedback!



education to the universe

BIG PI

“Mathematics... is invention of better notations.” - Richard Feynman

$$\prod_{k=m}^{k=n} a_k = a_m a_{m+1} \cdots a_n$$

Math is the language of the universe, and **notation** is the language of math. To express a new abstract idea, consider building off an already established convention, like Sigma notation. This time, let “Bi Pi” be a repeated product.

Consider the factorials:

$$\prod_{k=1}^4 k = 1 \cdot 2 \cdot 3 \cdot 4 = \underline{\hspace{2cm}}$$

Music tie-in: an even-tempered scale

$$2 = \prod_{k=1}^{12} x$$

