בס"ד

Happy Purim from the Lansey Family Adar 5766 / 2006

The Lansey Family Purim Theme this year is **SCHOOL**, as all five of us are in school in one way or another this year: Bob is teaching at Kean, Eli is in his first senior year at YU, Yoni is a sophomore at NJIT, Aryeh is a Rutgers Engineering freshman, and Lill is taking courses at Avtech Institute.

Make sure you spend your Purim day working on your three R's: Reading the Megilla, Riding Around Town Delivering Shalachmonos, and Eating Hamentaschen. May your Purim celebration have a lot of class.

If you are getting this, that means you are part of our clique, the Geeks, and may sit with us at lunch. No Jocks, Goths, Preppies, Fashionistas, Cheerleaders, etc. allowed.

The following is your homework assignment, due Erev Pesach. These questions will also be on the test. You are allowed one class period of 45 minutes to complete the entire assignment. Do not base your answers on Cliff Notes, the movie version of Black Beauty, A Beautiful Mind, any Simpson's or Bugs Bunny episode, or graffiti in the bathroom. Do not download essays off the Internet, use the same essay you handed in for a History assignment, or copy off of your friends. Your homework, when completed, should not add more than 20 lbs to your backpack.

Make sure to use a sharpened No. 2 pencil. You may also use a calculator. You must do the assignment no matter what you got on your SAT's; or what you really got. Your grade on this assignment will go on your permanent record. If you do not complete this assignment on time, a note will be sent home. If you need more space you may write in the margins or on the back of the page. Show all work.

You may not use this assignment as an excuse to get out of Gym. You may work on the bus as long as your singing does not disturb those who are sleeping. You may not engage in any activity while doing the assignment that results in your getting sent to the Principal's office.

If female, you must do the assignment while wearing a denim skirt that drags along the ground even though you are wearing 5 inch platform shoes, your socks must be long enough to wear as a scarf, and your shirt sleeves must cover your elbows even when dialing your cell phone. If male, you must be wearing a buttoned down shirt (no logo) which must be tucked in at all times, your kippah must be over 4.53 inches in diameter (see attached photocopy), no baseball cap, no jeans, and your skirt only needs to cover your knees.

HOMEWORK ASSIGNMENT - Due Erev Pesach (page 1)

COMPUTER SCIENCE (Submitted by Bob)

____ True or False?: The PSTN is a WAN for POTS that is provided by LEC's and IXC's.

The best way to connect to the Internet is to:

a. Drive around your neighborhood and try to find someone's wireless hotspot.
b. Write a letter to Al Gore.
c. Order service from an ISP.
d. Build a satellite earth station in your backyard.

A Social Network is a:

a. Group that meets every month at your Shul.
b. Web site you can use to find someone with similar interests.
c. New Cable TV channel with information about dating.
d. Group of friends that you hang out with.

SOCIOLOGY

Go to **www.OnlyTzaras.com**. Click on each link and read every post. Review the photo galleries.

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HOMEWORK ASSIGNMENT - Due Erev Pesach (page 2)

LITERATURE (Questions Courtesy of Dr. Breau, RPRY 7th grade English, circa 1999 (we couldn't make this stuff up)). Write a brief (at least 3 pages, single spaced) essay on each of the following questions on Black Beauty, by Ann Sewell:

1. Explain the "straight and narrow path" that defines much of the Christian thinking on which Sewell bases her story. What happens to those who do not stay on this path? Does Judaism think about good and bad behavior in a similar way? If so, describe the similarities that you see. If you see differences between Judaism and Christianity, explain them. Note: it is perfectly acceptable to discuss both similarities AND differences in your answer.
2. In the "Great Chain of Being," G-d, the angels, and all living beings are believed to exist in a specific order. What is this order? What's the point of it? How does Sewell use the idea to imagine how horses see people? Do you find this convincing? Why or why not?
3. Although the main moral in Black Beauty is that people should treat animals humanely, many of the book's chapters also concern other moral lessons. Choose two chapters from the following list and discuss the particular morals they address: "Only Ignorance," "The Sunday Cab," "Reuben Smith." Identity the particular moral of each of the chapters you discuss and explain how the novel's overall lessons about how we treat animals is helped or hurt by the specific, additional moral lesson of that particular chapter. You must discuss two of the three chapters listed above, it is not acceptable to write about any other chapters in response to this question.

PHYSICS (Submitted by Eli)

Solve the one-dimensional Schrödinger equation, $-\frac{\hbar}{2m}\frac{\partial^2\Psi}{\partial x^2}+V(x)\Psi=i\hbar\frac{\partial\Psi}{\partial t}$ (hint: try 'separation of variables'), for a free particle (hint: $V(x)=0$). Then, given a Gaussian momentum distribution $g(k)=\left(\frac{a^2}{2\pi}\right)^{\frac{1}{4}}e^{-\frac{a^2}{4}(k-k_0)^2}$, (for extra credit, verify that this is normalized,) show that $\Psi(x,t)=\left(\frac{a^2}{2\pi}\right)^{\frac{1}{4}}\int_{-\infty}^{+\infty}e^{-\frac{a^2}{4}(k-k_0)^2}e^{ikx}e^{-i\omega t}dk$, where $\omega=\frac{\hbar k^2}{2m}$, solve the integral (hint: 'complete the square'), find $\Psi^*(x,t)$, find how the average position and momentum change with time, calculate the uncertainty in *x* and *p*, and verify that $\sigma_x\sigma_p\geq\frac{\hbar}{2}$ for all *t*. If you have time, compare the result in the limiting case $t\to\infty$ to a classical case with the same momentum distribution. Show all work.

MATH (Submitted by Yoni)

Show that the error, e_n, in Newton's root finding method, converges like $e_{n+1}=-\frac{f''(x_n)}{2f'(x_n)}e_n^2$ as *n* becomes large.

ENGINEERING (Submitted by Aryeh)

During a helicopter ground test, with both main and tail rotors in steady operation, a 400-N aerodynamic force is exerted on the tail rotor. Determine the equivalent force-couple system at the center point of the main rotor. The distance from the center of the tail rotor to the center of the main rotor is six meters.

EXTRA CREDIT (Submitted by Yoni)

Prove than every even number (except for 2) is the sum of two primes (Goldbach Conjecture).