



Brooklyn Technical High School

"for engineering, mathematics, science, computers, and technology"

Randy Asher, Principal

Department of Mathematics

Please Read: This application is for you to be considered for our Freshman Math Analysis Class, which is the core of our Freshman Math Team. This is a regularly-scheduled class which meets one period every day. If you are not accepted for the class, you can still be a member of the Math Team by attending weekly after-school meetings and competing in after-school contests.

Please fill out the information below and send it back to the Math Department along with your solutions to the attached problems, by **June 15, 2011**. You can scan and e-mail your application and solutions to BrooklynTechMathTeam@gmail.com, or you can mail your application and solutions to the following address, provided that we RECEIVE them by the date above:

Math Department / Math Team
c/o Rhonda Pekow, AP
Brooklyn Technical High School
29 Fort Greene Pl.
Brooklyn, NY 11217

Please Print Clearly 9-digit OSIS # (if known) _____

Last Name _____ First Name _____

E-mail address _____

Your School _____ Borough _____

New York State Examinations in Mathematics you have taken, and scores
Integrated Algebra _____ Geometry _____ Algebra 2/Trigonometry _____ None _____

Current Math Class _____ Grade in class _____% *or* A B C D F (circle one)

Math Classes taken outside of school (colleges, NSF, etc.)

Name of Program _____ Location _____ Grade _____

Have you ever been a member of a Math Team? Yes _____ No _____

Did you participate in any of the following competitions?

AMC 8 Score _____ AMC 10 Score _____ Other (name) _____ Score _____

Did you or your team receive any awards? Yes _____ No _____ (Check one)

If yes, please describe briefly (Such as "First Place" or "Individual High Score", etc.)

We may offer a special training session for incoming students this summer. This would most likely be during a week in middle to late August. Would you be able to attend?

Yes _____ No _____ (Check one).

If not, are there other possible weeks for you to join us this summer? _____

FOR INCOMING STUDENTS WHO ARE INTERESTED IN OUR MATH TEAMS

Try any or all of the following problems at your leisure. Some of the problems you may find to be rather easy, while others may challenge you. Please write your solutions on a separate page or pages. Keep this problem sheet for reference. In addition to your answers, we are very interested to see how you arrived at your answer. Please write neatly and be sure to put your name on any pages you submit.

1. Compute without using a calculator: $(987654321)(987654321) - (987654323)(987654319)$.
2. Find the smaller angle formed by the hands of a clock at 12:25.
3. How many positive integer divisors has 144?
4. A car travels from A to B at 20 mph and returns over the same route at 60 mph. What is the average rate for the round trip if the distance from A to B is 15 miles?
5. A 25 foot ladder leans against a vertical wall. The foot of the ladder is 7 feet from the base of the wall. If the top of the ladder slips 4 feet down the wall, how far will the foot of the ladder slide?
6. Two sides of an isosceles triangle are 8 and 17. Compute its perimeter.
7. If the diagonal of a square is 6, what is the area of the square?
8. Find the volume of a rectangular solid if the areas of three of its adjacent faces are 12, 8 and 6.
9. If m women can do a job in d days, how long will it take w women working at the same rate to do the same job.
10. Find the 100th place to the right of the decimal point in the decimal expansion of $1/13$.
11. What is the units digit of 7^{42} ?
12. Find the 100th term in the sequence 77, 71, 65, 59,....
13. Find the sum of the roots of the equation $4x^2 + 5 - 8x = 0$.
14. If 713512A1 is divisible by 3, find all possible values of the missing digit A.
15. In triangle ABC, $AC=BC$. The point D is on BC such that $AB=AD=DC$. Compute the measure of angle C.
16. Joan's stamp collection consists of three books. Two tenths of her stamps are on the first book, several sevenths are in the second, and there are 303 stamps in the third book. How many stamps are there in Joan's collection?
17. Solve for all real values of x if $9^{x+2} = 240 + 9^x$
18. A circle of radius 2 is externally tangent to a circle of radius 8. Compute the length of their common tangent.
19. Compute the value of the sum of the reciprocals of the roots of the equation $x^2 + 7x + 11 = 0$
20. Two swimmers at opposite ends of a ninety foot pool start to swim the length of the pool, one at 3 feet per second and the other at 2 feet per second. If they swim back and forth for twelve minutes, how many times do they pass each other?