WILLISTON
NORTHAMPTON SCHOOL

Required Math Summer Review Homework

BC Calculus

Please complete the problems below and bring them with you the first day of class.
If you need more practice or information about these concepts, please review them in our Calculus text.
You can also find excellent Calculus tutorials at http://www.math.hmc.edu/calculus/tutorials/ from
Harvey Mudd College.

We will be starting off with new work on the first day of classes, so it is important that you review your AP Calculus. You should practice taking limits, differentiation, and antidifferentiation. The better you remember this work, the more successful you will be in BC.

1. Write out the terms of a right Riemann sum with four subdivision for $f(x) = \dfrac{2+x}{x}$ on $2 \le x \le 4$ and approximate the sum with three-decimal accuracy.

2. Transform the integral $\int_{1}^{4} x2^{x^2}\,dx$ using the substitution $u = x^2$. What are the new limits of integration? Use the Fundamental Theorem of Calculus to find the exact value of this integral.

3. Find the equation of a line tangent to the function $G(x) = 5 - \int_{2}^{x} \frac{18}{1+t^3}\,dt$ at $x = 2$.

4. Find a formula for the area between the *x*-axis and the parabola $y = -ax(x - 2b)$. The constants *a* and *b* are both positive.

5. Find a formula for $\displaystyle\int_0^{2a} \frac{4x - 2}{1 + x^2}\,dx$ in terms of *a*.

6. Use L'Hopital's rule to find the value of $\lim\limits_{x \to a} \dfrac{\int_a^x e^{t^2}\, dt}{x^2 - a^2}$. (Do not panic! You know how and when to apply L'Hopital's Rule. You will need the second fundamental theorem of calculus to differentiate the numerator.)

7. Find the x-value of the critical point of $f(x) = axe^{-bx}$ and decide whether it is a maximum or a minimum. Both constants are positive. Explain your choice.

8. Find the distance between the centers of the circles $(x+1)^2+(y-3)^2=10$ and $x^2-4x+y^2+2y+1=0$. (Suggestion: try completing the square.)