Are You Ready for AP Calculus?

(You may email your answers to Mrs. Olin at morgan.olin@cms.k12.nc.us and she will check them.)

1. Find the equation in ***point-slope form*** of the line: (look up the form if you do not remember it.)
   a. Through (-1, 3) and (2, -4)

   b. Through (5, 1) and parallel to the line $2x - 3y = 6$

   c. Through (-2, 1) and perpendicular to the line $5x + 2y = 10$

   d. Through (2, -4) and with a slope of 0.

2. Determine any vertical and horizontal asymptotes and holes in the graphs of each function. Also state the domain and range.

   a. $y = \frac{5x-2}{3x+1}$

   b. $y = \frac{x^2-2x+15}{2x^2+7x+3}$

3. Find each limit.

   a. $\lim\limits_{x \to \infty} \frac{3x^5-5x^2+1}{4x^5+9x^3-2x}$

   b. $\lim\limits_{x \to 2} \frac{1}{x-2}$

   c. $\lim\limits_{x \to 0} \frac{\sin x}{x}$

   d. $\lim\limits_{x \to \infty} \frac{e^x}{x^2}$

   e. $\lim\limits_{x \to \infty} \frac{\sin x}{x}$

4. Evaluate each Trigonometry expression without a calculator:

   a. $\sin \frac{5\pi}{4}$

   b. $\tan \frac{5\pi}{3}$

   c. $\sin \frac{\pi}{6}$

   d. $\cos \pi$

   e. $\tan^{-1}(-1)$

   f. $\sin^{-1}(1)$

   g. $\arccos(-1)$

5. Solve each word problem.

   a. A water tank has the shape of a cone (like an empty ice cream cone). The tank is 10 m high and has a radius of 3m at the top. If the water is 5 m deep (in the middle), what is the surface area of the top of the water?

   b. Two cars start moving from the same point. One travels south at 100 km/hour, the other west at 50 km/hour. How far apart are they two hours later?

   c. A kite is 100 m above the ground. If there are 200 m of string out, what is the angle between the string and the ground?

6. Algebra Skills.

   a. Simplify $\dfrac{\frac{1}{5}-\frac{1}{x}}{\frac{1}{x^2}-\frac{1}{25}}$

   b. Simplify. $\dfrac{x^3-8}{x-2}$

   c. Simplify $\dfrac{f(x+h)-f(x)}{h}$ if $f(x)=x^2+3x$

   d. Solve for z. $y^2+3yz-8z-4x=0$

   e. Solve. $x^3+x^2=6x$

   f. Simplify using Long Division.
   $$\dfrac{6x^3+15x-3}{3x+6}$$

7. Logarithms

   a. Evaluate. $\ln e$

   b. Evaluate. $\ln 1$

   c. Evaluate. $3\log_2 4+\frac{1}{2}\log_2 6-\frac{1}{2}\log_2 24$

   d. Expand. $\log_2\left(\frac{8x^4}{5}\right)$

   e. Solve. $\log_6(2x-6)+\log_6 x=2$

   f. Solve. $\ln(x+2)=\ln(x+7)-\ln(x-1)$