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

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

3. Find each limit.

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

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

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

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

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

4. Evaluate each Trigonometry expression without a calculator:

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

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

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

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