Optional!

~~Required~~ Math Summer Review Homework
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 visit: http://www.williston.com/summer-coursework

1) Find an equation of a line through the points (2 , 3) and (-5 , -2) in **point-slope** form. Leave all numbers in fraction form.

2) Find an equation of a line through the points f(-3) = 1 and f(4) = 6 in **slope-intercept** form. Leave all numbers in fraction form.

3) The pressure P (in lbs/ft^2) in a pipe varies over time according to the formula

$$P(t) = -70 \cos\left(\frac{\pi}{6} t\right) + 160 \text{ where } t \text{ is in minutes.}$$

Evaluate $P(5)$ and interpret your answer in the context of the problem. Be sure to use correct units.

4) Given $f(x) = 2e^x + 5$. Find the average rate of change of $f(x)$ from $x = 2$ to $x = 4$. (Simplify and leave your answer as an exact value in terms of e- i.e. no decimal approximations.)

5) An object is dropped from a height of 3000 ft. It's height off of the ground is given by the function $h(t) = 3000 - 16t^2$ where $h(t)$ is measured in feet. Find the object's average velocity from $t = 1$ to $t = 3$. Be sure to use correct units in your answer.

6) Given the table below.

time(days)	0	10	20	30
Population (mice)	100	110	125	145

   a) What is the average rate of change of the mice over the first 20 days? Be sure to use units in your answer.

   b) Is this function increasing or decreasing? Explain your answer.

7) Given $g(x) = 2x^2 - 4x + 2$, find the average rate of change of $g(x)$ on each of the following intervals.

    a) $x = 0$ to $x = 3$

    b) $x = 2$ to $x = 2 + h$ (Simplify as much as possible.)

8) Factor each of the following completely.

a) $3x^2 - 24x + 45$ b) $2x^4 + 2x^3 - 18x^2 - 18x$

9) Solve the following equation for x.

    $6x^3 = 34x^2 - 20x$

10) Solve each of the following equations for x **exactly**- i.e. no decimal approximation.

a) $4x - 600x^{-1} = 0$

b) $4\pi x - 1420x^{-2} = 0$