Homework 1

Do these problems on a separate sheet of paper. Be sure to read the homework policy in the syllabus.

Problem 1: Write down the equation of the line with slope 16 that passes through the point $(-1,3)$.

Problem 2: Write down the equation of the line that passes through the points $(-1,3)$ and $(2,-6)$.

Problem 3: Determine the point(s) where the line going through $(2,0)$ with slope -1/3 intersects the circle $x^2+y^2=1$.

Problem 4: Let $p(z)=z^2$ and suppose that a is some real number. Your answers to both of the next questions will be in terms of a.

(a) What is the slope of the line passing through the points $(0,0)$ and $(a,p(a))$?
(b) What is the equation of the line passing through the points $(0,0)$ and $(a,p(a))$?

Problem 5: Suppose that a and h are real numbers with $h>0$. Let $f(x)=\cos(x^2)-2$. What is the slope of the line through the points $(a,f(a))$ and $(a+h,f(a+h))$? Your answer will be in terms of a and h. You do not need to simplify your answer.

Problem 6: Suppose that $h>0$. Let $g(x)=e^x+e^{-x}$. What is the equation of the line through the points $(0,2)$ and $(h,g(h))$? Your answer will be in terms of h. You do not need to simplify it.

Problem 7: A rectangle is inscribed inside the ellipse $2x^2+y^2=4$.

(a) Sketch a fairly accurate picture illustrating the setup.
(b) Suppose that the rectangle has its upper right corner at the point $(1,\sqrt{2})$. What is the area of the rectangle?
(c) Now suppose that the rectangle has its upper right corner at an arbitrary point $(x,\sqrt{4-2x^2})$. What is the area of the rectangle in terms of x?
(d) Your answer from (c) is an expression in terms of x. Call that expression $A(x)$ (for area). Use a graphing calculator or computer to graph $A(x)$ for $0\le x\le\sqrt{2}$. For (approximately) what value of x is $A(x)$ the largest?