

Math 114 First Exam Spring 2005 Lamb

Useful formula:  $f(x) = ax^2 + bx + c$ , where  $a \neq 0$

Then the vertex of the parabola is  $(-b/(2a), f(-b/(2a)))$ .

Show Work 100 points Each worth 9 points, except #7 is 18.

1. Solve the inequality:  $-3 < 1 - 6x \leq 13$

Give your solution in interval notation, e.g.  $[5, \infty)$ , etc.  
and sketch a graph of your solution on the real number line. 1

2. Write the equation of the line through  $(-2, -3)$  that is perpendicular to the line  $y - 3 = (-2/3)(x + 5)$ .

3. Given the functions  $f(x) = 3x^2 + 2x - 6$  and  $g(x) = x^{0.5}$   
What is the domain of the composite function  $g \circ f$  ?

4. What is the equation of the circle with center  $(-3, 4)$   
that passes through the point  $(5, 8)$  ?

5. Solve for x:  $|x| = -x$ .

6. What is the least value of the function  $f(x) = 5x^2 + 3x - 4$ ?

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7. Given a triangle in the x-y plane with vertices ( 1 , 3 ), ( 5, 11 ), and ( 8 , 2 ) .  
(a) Is it a right triangle? Why/why not? (hint; slopes...)

(b) Find the equation of the line which is the perpendicular bisector of the side joining ( 1 , 3 ) and ( 5 , 11).

8. What is the inverse function of  $f(x) = (3x - 2) (2x + 5)^{-1}$  ?

9. Sketch a graph in the x-y plane of  $y = |x + 3| - 5$ . Label any x or y intercepts.

10. Let the x-axis represent degrees centigrade. Let the y axis represent degrees Fahrenheit. Water freezes at 0 degrees centigrade and 32 degrees Fahrenheit. And it boils at 100 degrees centigrade and 212 degrees Fahrenheit. Find a linear equation relating the two scales.