Math 141 **version A** Name: _____
May 17, 2011

Test 2: In-Class Version
84 points

You may use a calculator, but **no** notes, homework, or books allowed. Show your work, where possible, for full credit. Circle or box your answers if needed to make them clear.

1. [5 pts each] For the quadratic function $f(x) = 2x^2 - 6x + 5$
   a. Express the quadratic function in standard (vertex) form. Show work.

   Answer: _____

   b. Find the vertex and state if it is a minimum or maximum

   Vertex: _____ Maximum Minimum (circle one)

   c. Find the *x*-intercept(s). Leave answers in exact (not decimal) form.

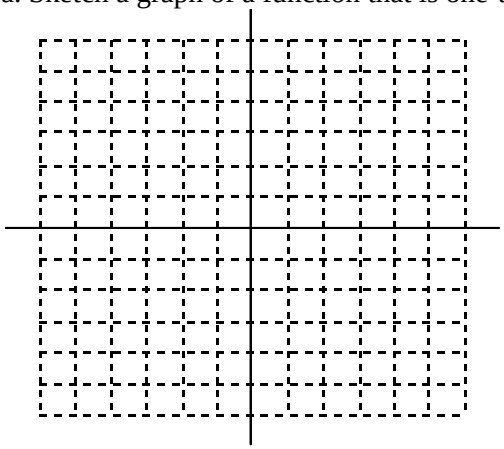
2. Find a function whose graph is a parabola with vertex (3, 5) and that passes through the point (1, 13). Show work. [6 points]

3. Find the inverse function of $f(x) = 8 - x^2, x \geq 0$. Show work. [6 pts]

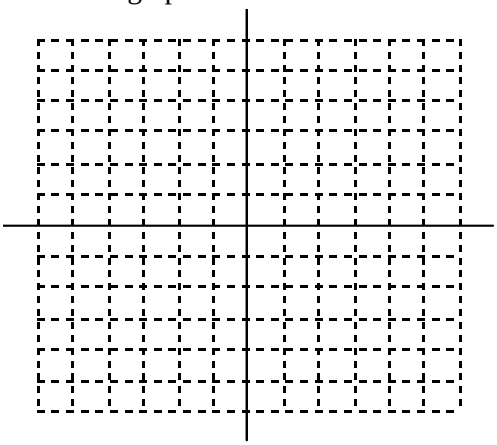
4. Assume *f* is a one-to-one function. If *f*(2) = 5, find $f^{-1}(5)$. [4 pts]

5. [3 pts each]

a. Sketch a graph of a function that is one-to-one.

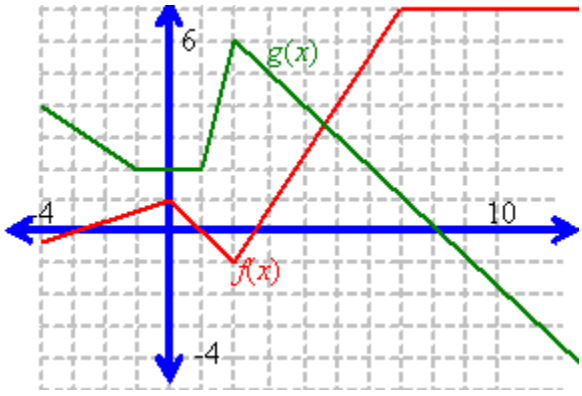


b. Sketch a graph of a function that is NOT one-to-one.



6. Given the graphs of *f* and *g* below, find the following: [2 pts each]

$(g \circ f)(1) =$_____ $(g \circ g)(2) =$_____ $(f \circ g)(0) =$_____



7. Define functions *f* and *g* such that $F = f \circ g$ if $F(x) = \dfrac{\sqrt{x}}{\sqrt{x}+5}$. [5 pts]

8. If $f(x) = \sqrt{5-4x}$ and $g(x) = x^2$ find the functions below and their domains. Write domain answers with exact answers and using correct notation. [5 pts each]

   a. $(f \circ g)(x)$ b. $\left(\dfrac{f}{g}\right)(x)$

   Function: _____ Function: _____

   Domain: _____ Domain: _____

9. The sum of two positive numbers is 20. Find a function that models their product *P* in terms of *x*, one of the numbers. Show work. [6 pts]

10. For the circle given by $x^2 + y^2 - 4x + 6y - 2 = 0$, [8 pts]
    a. Put the equation in standard form

    b. find the center (h,k)

    c. find the radius, r (leave in exact form, not a decimal).

11. Two ships leave port at the same time. One sails south at 10 mi/h and the other sails east at 24 mi/hr. Find a function that models the distance D between the ships in terms of the time t (in hours) elapses since their departure. Show work. [6 pts]

12. A softball is hit directly up into the air and its height, in feet, above the ground after t seconds is given by

$$h(t) = -16t^2 + 96t + 3.$$

    a. When does it reach the maximum height? Show work. [3 pts]

    b. What is the maximum height of the ball? [3 pts]