

Test 2C - MTH 1210
Dr. Graham-Squire, Fall 2013

Name: _____

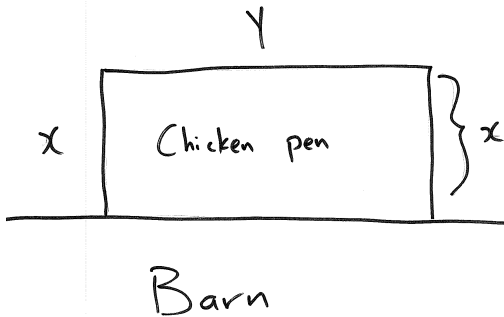
I pledge that I have neither given nor received any unauthorized assistance on this exam.

(signature)

DIRECTIONS

1. Don't panic.
2. Show all of your work and use correct notation! A correct answer with insufficient work or incorrect notation will lose points.
3. Clearly indicate your answer by putting a box around it.
4. Cell phones are not allowed on this test. Calculators and/or computers are allowed on the first 2 questions of the test, however you should still show all of your work. No calculators are allowed on the last 7 questions. Students using computers are only allowed to view websites for graphing functions and online calculators such as web2.0calc.com, bcalc.net and meta-calculator.
5. Give all answers in exact form, not decimal form (that is, put π instead of 3.1415, $\sqrt{2}$ instead of 1.414, etc) unless otherwise stated.
6. If you need it, the quadratic formula is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.
7. Make sure you sign the pledge.
8. Number of questions = 9. Total Points = 85.

1. (10 points) Farmer Bob has decided to build a new rectangular pen to keep his chickens in. The pen will be next to the barn, so he only needs to fence in 3 of the sides. Because he does not want his chickens to think that he is cheap, Bob will make the two sides perpendicular to the barn out of gold fencing (at a cost of \$25 per foot). Let the length of the perpendicular side be x . The side parallel to the barn (with length of y) will be made out of standard fence material, at \$10 per foot. Bob only has \$500 to spend on the fence. Use mathematics to find the maximum possible area for the pen. (Hint: Write an equation for the area of the pen and another equation for the cost of the fencing. Use those to write an expression $A(x)$ for the area of the pen in terms of the single variable x . Then find the maximum of $A(x)$.)



2. (10 points) Find all zeroes of the polynomial $g(x) = x^4 - 5x^3 + 5x^2 - x - 12$.

3. (10 points) (i) Let $f(x) = \frac{3x^2 - 12x}{x^2 + x - 6}$. Find the following for the graph of f . If something does not exist, write DNE for your answer and explain why it does not exist.

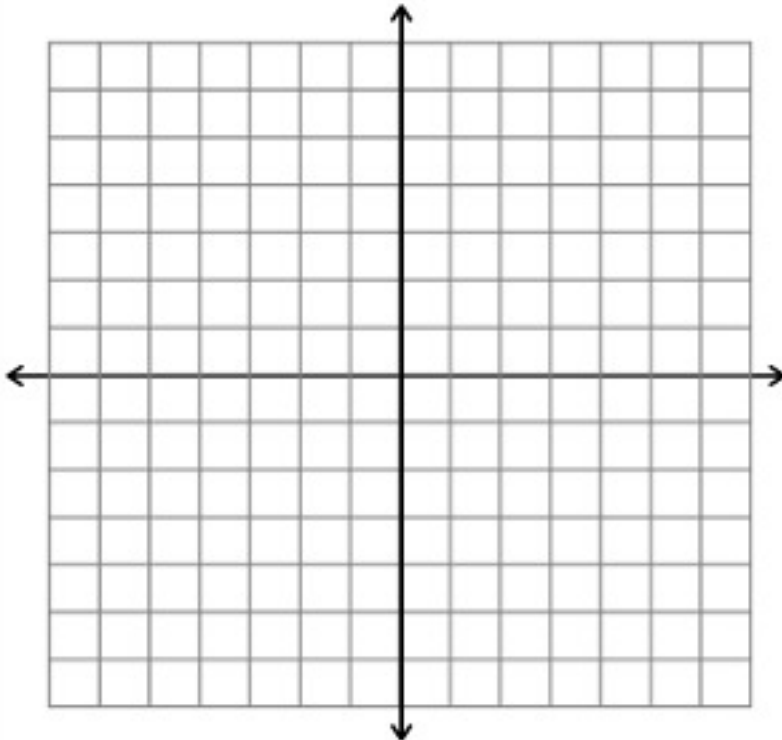
(a) x -intercept(s):

(b) y -intercept(s):

(c) Vertical asymptote(s):

(d) Horizontal asymptote(s):

- (ii) Use the information above to sketch a graph of f .



4. (5 points) In words, describe how you would shift, stretch or flip the graph of $f(x) = \sqrt{x}$ to get the graph of $g(x) = 4\sqrt{-x} - 3$. Make sure to specify in what order you do the changes.

5. (10 points) Let $f(x) = \sqrt{x}$, $g(x) = \frac{x}{x-1}$ and $h(x) = x^4$. Unless otherwise stated, you should simplify the expression given below. Assume that your answer should be a real number. If the expression is undefined, write DNE (does not exist) and explain why it does not exist.

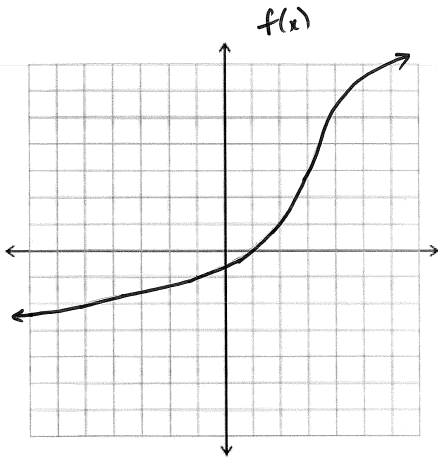
(a) $h(g(f(x)))$ (You do not need to simplify this one)

(b) $h(f(-2))$

(c) $f(h(-2))$

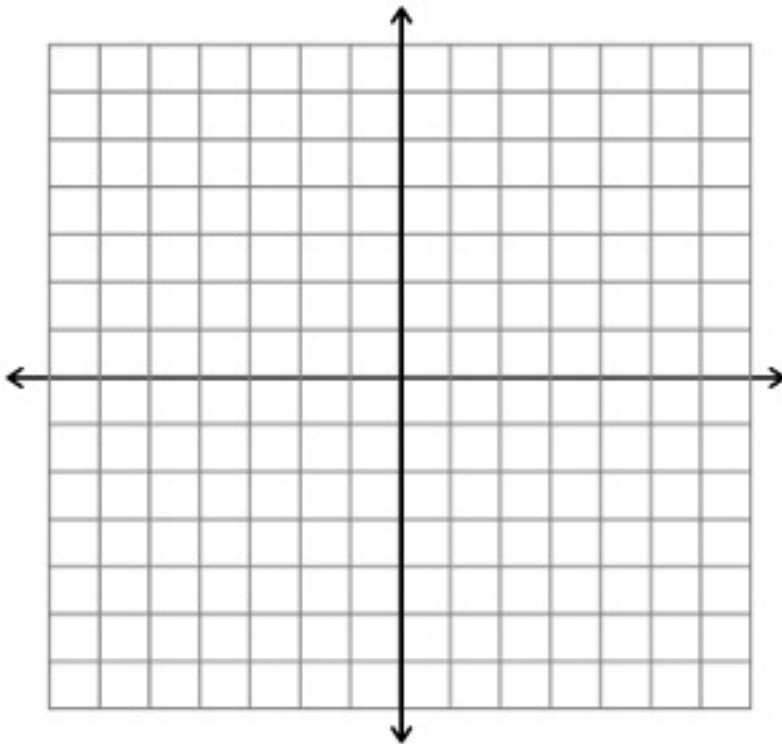
6. (10 points)

(a) Given the graph of $f(x)$ below, sketch its inverse function $f^{-1}(x)$ on the same set of axes.

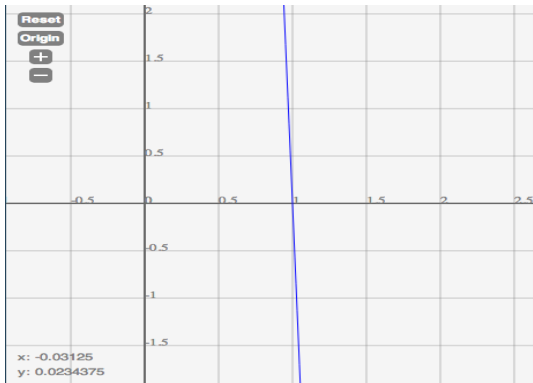


(b) Find the inverse of $g(x) = \frac{3x}{x-4}$

7. (10 points) Factor the polynomial $f(x) = x^4 - 9x^2$, and then use your factorization to graph the function.



8. (10 points) A piece of the graph of $g(x) = x^3 - 8x^2 - 23x + 30$ is given below. Use the graph and polynomial long division to completely factor $g(x)$.



9. (10 points) Completely factor the polynomial $f(x) = x^4 - x^3 + 4x^2 - 4x$.

Extra Credit(up to 2 points) Choose if you want 1 point extra credit or 2 points extra credit. If you choose 1 point, you are guaranteed to get that 1 point. If you choose 2 points and more than 80% of the class also chooses 2 points, then you get zero. If less than 80% of the class chooses 2 points, then you get the full 2 points.