

NAME: _____

Student ID #: _____

QUIZ SECTION: _____

Math 120A, Midterm II

May 10, 2012

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Total:	50	

- Your exam should contain 5 problems on 4 pages. Check that your test is complete!
- This exam is 50 minutes long.
- You are allowed to use a calculator and one double-sided sheet of notes. All other electronic devices (including cell phones) should be turned OFF and be put away.
- **Unless otherwise stated, you must show how you get your answers. Correct (or incorrect) answers with incomplete or missing supporting work may result in little or no credit.**
- Please box your **final answer**.
- Unless otherwise specified, you may round off your final answer to 2 decimal digits, or leave it in exact form (ex: $\sqrt{2} + \frac{2}{3}$). Do not round off the base of an exponential function, or any values that are not final answers.
- If you need more room, use the backs of pages and indicate to the grader that you have done so.
- Raise your hand if you have a question.

GOOD LUCK!

1. (15 pts) Consider the function $f(x) = 3 - \sqrt{2x - 1}$.

a) (7 pts) Compute the inverse function, $f^{-1}(y)$. Show all steps. Indicate the correct domain for the inverse function.

b) (8 pts) In this part, there is no need to show work or justify your answers. Start with the basic function

$$g(x) = \sqrt{x}, \text{ restricted to domain } 0 \leq x \leq 4.$$

List the graph shifts, stretches or compressions, and reflections which, when applied to the graph of $g(x) = \sqrt{x}$ in the listed order, would result in the graph of $f(x) = 3 - \sqrt{2x - 1}$. Be precise (ex: "first a shift up by 2 units").

Horizontally: First _____

Then _____

Vertically: First _____

Then _____

If we start with domain $0 \leq x \leq 4$ for $g(x) = \sqrt{x}$, what is the resulting domain after the above transformations?

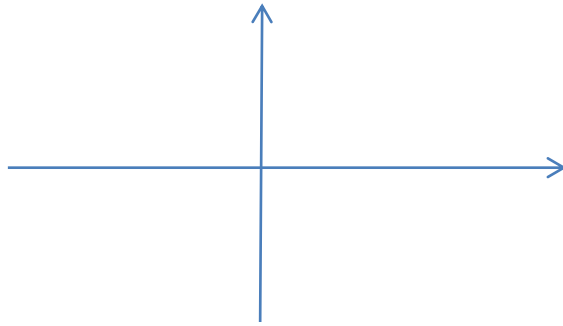
$$\underline{\hspace{2cm}} \leq x \leq \underline{\hspace{2cm}}$$

2 (7 pts) Consider the function:

$$y = (-0.5)8^{(2+(x/3))}$$

Put it in standard exponential form, $y = Ab^x$. Show your steps, and box your final answer.

Then sketch its graph, and label the values of any x or y -intercepts. No need to show work.



3 (5 pts) Solve the equation: $10^{\log_3 x} = 7$

4 (13 pts) In 1990, the U.S. minimum wage was \$3.80 per hour. In 1997, it was \$5.15 per hour. Assume the minimum wage grows according to an exponential model $W(t)$, where t represents the number of years after 1990.

a) (6 pts) Find a formula for $W(t)$.

b) (2 pts) What does the model predict for the current minimum wage? (year 2012)

c) (5 pts) In what year is the minimum wage expected to reach \$100 per hour, according to this model?

5 (10 pts) The number of doughnuts sold by a local shop depends on the amount of money spent on advertising. If the shop spends \$50, it sells an average of 200 doughnuts a day. If it spends \$200 in advertising, it sells 350 doughnuts a day. As the shop spends more and more on advertising, the number of doughnuts sold will approach (but not reach) 600 doughnuts per day.

Assume that the number y of doughnuts sold per day is a linear-to-linear rational function of the $\$x$ spent on advertising.

Determine how much money the shop should spend on advertising in order to sell 500 doughnuts per day.

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