

Math 120 – Ch 8 & 9 Test Prep – Dr. Loveless

Take 5 minutes to try to complete this page. After 5 minutes, flip to the 2nd page to see a solution outline and grading rubric. Grade yourself to see how you did. Then discuss the solution with your TA. If you have time you can also try the other problem on page 3 which has to do with chapter 9 material and is more of a challenge problem (or please switch to homework question if you have them!).

Participation Code: Please remember to ask your TA for the participation code for today and don't forget to enter it in the corresponding Canvas quiz. There is a second question in the participation quiz that will give you a peek at exam 2 topics and show you can old exam. Take 5 minutes later today to do that.

[\[F09 Exam 2 - Loveless\]](#)

Problem 3(b): If $f(x) = 3x + c$ and $f(f(x)) = 9x - 10$, find the value of c .

Problem 3(c): Find the inverse function of $g(x) = \frac{(\sqrt{x}-1)^2}{3}$, on the domain $0 \leq x \leq 1$

Outline of Solution with typical grade marks (one blank has been left for you to fill in):

(4 pts) Problem 3(b): If $f(x) = 3x + c$ and $f(f(x)) = 9x - 10$, find the value of c .

$$f(f(x)) = 3(3x + c) + c = 9x + 3c + c \quad (+1 \text{ show composition})$$

The problem asks for us to find c such that

$$9x + 3c + c = 9x - 10 \quad (+1 \text{ equating})$$

Thus, we need

$c =$  (+2 solving and conclusion)

(4 pts) Problem 3(c): Find the inverse function of $g(x) = \frac{(\sqrt{x}-1)^2}{3}$, on the domain $0 \leq x \leq 1$

We will solve for x in terms of y

$$y = \frac{(\sqrt{x} - 1)^2}{3} \Rightarrow 3y = (\sqrt{x} - 1)^2 \quad (+1 \text{ started solving})$$

$$\Rightarrow \pm\sqrt{3y} = \sqrt{x} - 1$$

⇒

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(+1 finished solving)

The problem asks for the solution when $0 \leq x \leq 1$, in order for this expression to be less than 1, you must choose the negative. So the final answer is.

$$g^{-1}(y) = (1 - \sqrt{3y})^2 \quad (+2 \text{ conclusion})$$

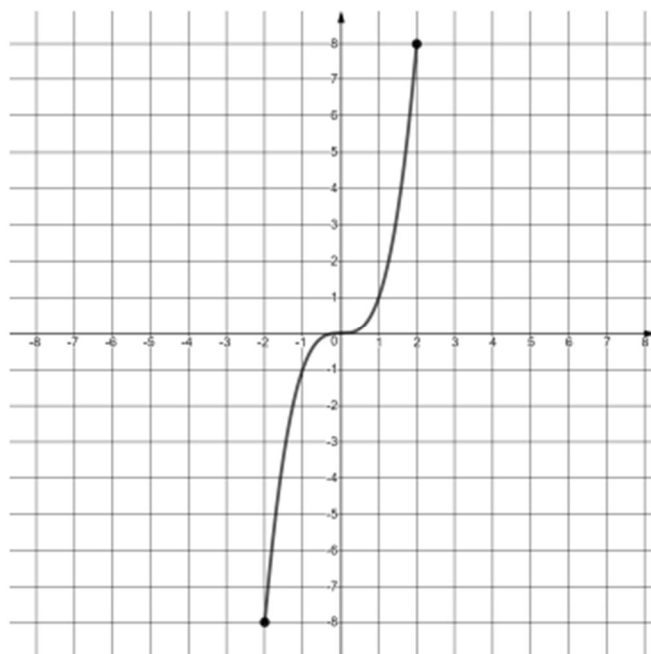
It is also acceptable to write $g^{-1}(x) = (1 - \sqrt{3x})^2$ or use any other input variable if you desire.

The following problem is from [Nichifor Winter 2019 Exam 2 Problem 2](#).

This ask two questions related to inverses, one graphical and one solving with quadratics. If you run out of things to talk about in quiz section try it out. Solutions can be found via the link above.

2. (6 points) The following is the graph of a function $F(x)$, with domain $-2 \leq x \leq 2$.

On the same grid, sketch the graph of its inverse function, $F^{-1}(x)$. Also, specify its domain and range.



The domain of F^{-1} is: _____, and the range of F^{-1} is: _____

3. (6 points) Consider the function $G(x) = -3x^2 + 18x$, with domain $x \geq 3$. Find the rule for $G^{-1}(x)$.