MAT 121 Test 2, #6 Re-Do – Fall, 2019 Name_____
30 Points From Chapter 2 NO GRAPHING CALCULATORS!!!

This Assignment is due the day you come to take Test 3, in about 2 weeks. (10/30-10/31). Maybe we should talk about testing on Halloween. I can leave the test window open until Monday, November 4th, but I'd rather you got it out of the way and got an early start on the next (and final) segment of material.

So let's open up the Open Test Dates to October 30th – November 4th. Most people take the test on the Thursday, so I'm not thinking opening up Tuesday is going to help many. But let me know at hmills1@aims.edu if you want to work ahead.

Discussion: (The question is on Page 2.)

I meant for #6 (See #6 on the test I thought you were taking) to be built around the reciprocal-cubed function, which for most intents and purposes is the reciprocal-function $r(x)=\frac{1}{x}$. It's shorter than $r(x)$, when you're close to the *y*-axis, and a little bit taller than $r(x)$ when you're far away from the *y*-axis. But the reciprocal-cube-root has the same shape and the same $(-1,-1)$ and $(1,1)$ as the key points where the shorter-taller becomes taller-shorter.

On the Test Solutions, I worked a reciprocal-cubed and a reciprocal-squared function. I ended up grading square-root versions of the question, but I didn't write out the solutions, properly.

I thought I was giving you $g(x)=\frac{-5}{(2x+4)^3}+7$. My last draft was correct, but you didn't get it!

This just gives me a chance to hit you again on something that troubles many students. Nice. Remember that **every graph of these reciprocal functions better have 2 asymptotes, clearly shown and labeled. The label "*y* = 0" when the *x*-axis is a horizontal asymptote will suffice. As will "*x* = 0" for the *y*-axis. (It's hard to do a dotted line over the top of the *x*- and *y*-axes you just drew.) But I'll need to see dotted-line asymptotes, with labels, as soon as you shift horizontally and/or vertically, as necessary.**

But now that I've shown you reciprocal-cubed and reciprocal-squared to the max, maybe all that's left is a reciprocal-root function. If I do a square-root, it's only half the work. If you can do a CUBE root, then the square-root becomes (essentially) the right half of the picture, unless there's a horizontal flip, with something like a -5*x* inside the function. Yeah. that's what we'll do. A reciprocal-cube-root! With a horizontal flip inside!

The Question: Let $g(x)=\frac{2}{\sqrt[3]{-5x-35}}-3=\frac{2}{(-5x-35)^{\frac{1}{3}}}-3=2(-5x-35)^{-\frac{1}{3}}-3$, which is based on the reciprocal-cube-root function, which is about as far as we can take it!

a. (20 pts) Sketch the graph of $g(x)$, by transforming the basic function $f(x)=\frac{1}{\sqrt[3]{x}}=\frac{1}{x^{\frac{1}{3}}}=x^{-\frac{1}{3}}$. I want to see two (2) points labeled in the graph of f, namely $(-1,-1)$ and $(1,1)$, and track where those points are moved to after every step, as demonstrated in video, until you've transformed f into *g*. This will take 5 graphs, counting the first graph of $f(x)=\frac{1}{x^{\frac{1}{3}}}$ as the first. (I number them 0 thru 4, for no good reason.

b. (5 pts) State the domain and range of $g(x)$, based on your final graph. Use interval notation in your answer.

c. (5 pts) Find the *x*- or *y*-intercept(s) of $g(x)$, and label them, clearly, on the graph with ordered-pair labels (OPLs). For full credit, I expect a fraction, possibly improper, in lowest terms, for one, and simplified radical form for the other.

I'm fond of saying "no double jeopardy." There is an exception: When your initial mistake allows you to avoid the intended difficulty level.

Hint: If you're calculator-dependent, you may not realize that this function accepts negative values of *x*. In other words, the domain includes a lot of negative numbers. Some computer-algebra systems will handle negative values, using "surd."

Background Material: Writing Project #2 Videos and Notes.

You may submit it electronically as a PDF, bring it with you to the test, or U.S. Postal Service.

To send by USPS, *early* :

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Otherwise, just bring it with you and hand in separately when you come in to take Test 3 and hand in Writing Project #3.