Math 181: Problem Set #7

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Due in 1 week at the start of class. Make sure to read Chapters 3 and 4 of Wardhaugh's *How to Read Historical Mathematics*.

Problem 1

Use Sturm's theorem to count the number of positive zeros that the equation $f(x) = x^3 - 3x^2 - 4x + 11$ has. Then construct intervals of the form (a, b) such that each interval contains exactly one of the positive roots.

Problem 2

The polynomial equation $f(x) = x^4 + x^3 + x^2 - x - 500$ has a root that lies between 4 and 5. Use Horner's method to find the first four digits of the root.

Problem 3

Transcribe the handwritten exam attached to this homework.

Problem 4

Solve questions four through nine on the exam that you transcribed.

Collaboration Policy

With each week's homework, you must turn in a one paragraph description of all the resources you used on that homework. You must mention any person you talked to about the problems, any book you looked at, any online resource (Wikipedia, Chegg,...) that you used. A sample paragraph is

> On this week's homework, I worked on the problem set collaboratively with Gauss and Grothendieck at The Redroom during happy hour. We found an Alex Jones video (http://youtube.blah.com) that gave a really

clear explanation of Fermat's Last Theorem. We got really stuck on Problem 5, and so we went to Chegg.com and paid an online tutor ("Zariski") $50 to solve the problem for us. He said the problem was too hard for him. So I logged into my TruthSocial account (@CobraTatesThesis) and posted the question with @realDonaldTrump tagged. He responded with a tremendous, really fantastic solution to the problem, which by the way, Biden can't solve. At this point, it was midnight and I still had four more problems to go, so I just gave the questions to ChatGPT and cut-and-pasted the answers.

Freshman Class. June 8 1844
Algebra

1 What is algebra, what are radical quantities, and how are such quantities reduced to the most simple form? (10)

2d How do you reduce Radical quantities to a common index? (10)

3d What are affected quadratic equations, and how do you find the value of the unknown quantity in such equations by the first method? and how by the 2d method? (10)

4th Reduce to a common index $\sqrt{2}, \sqrt[3]{2}, \sqrt[5]{2}$, (10)

5th Find the sum of $\sqrt[3]{32} \sqrt[3]{72}$ and $\sqrt{128}$ — (10)

6th Find the product of $\frac{a}{b}\sqrt{\frac{x}{y}}, \frac{4}{x}\sqrt{\frac{b^2}{a^2}}$ & $\sqrt{\frac{6x^2}{ay^2}}=$ (10)

7th " the value of x in $x^2+12x-589=0$ — (10)

8 In a mixture of Rum and Brandy, the difference between the quantity of each is to the quantity of Brandy, as 100 is to the quantity of rum, and the same difference is to the quantity of rum, as 4 is to the quantity of Brandy; How many gallons of each in mixture? (10)

9th Expand by the Bi-nomial Theorem the following, viz $(1+x)^5$ (10)

10th By whom was the Binomial Theorem discovered? what is the law for the exponents? and what for the co-efficient? (10)

Lester D. Prichard