

## Problem of the Week

Week 11, due Nov 11th 11.59pm

NAME: \_\_\_\_\_

NAU Email: \_\_\_\_\_

Instructor: \_\_\_\_\_

Please write clean, neat and complete solutions to the problem in order to receive full credit. Your job is to convince me, or really anybody who reads this document, that you understand the problem and are able to communicate what you are thinking about. Please submit your solutions through Gradescope(<https://www.gradescope.com/>) by the indicated deadline. You might need to create an account with your NAU email. To enroll into the Problem of the Week course use entry code: NYZ56P. Good luck and have fun!

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PROBLEM. Prove that  $\sqrt{2x\sqrt{(2x+1)\sqrt{(2x+2)\sqrt{2x+3}}}} < \frac{15x+6}{8}$  for all  $x > 0$ . Hint: Recall the AM-GM inequality: if  $x_1, \dots, x_n$  are non-negative real numbers, then

$$\frac{x_1 + x_2 + \dots + x_n}{n} \geq \sqrt[n]{x_1 \cdot x_2 \cdots x_n}$$

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