Instructions

Please use these questions to prepare for the exam. In addition to these problems, work on as many of the "Week n Problems" as possible. (You can find these problems posted in the corresponding weekly guides on the course page.)

You are strongly encouraged to leave working on these problems until **after** you have done a thorough review, and to work on them with your books closed.

Remember, you must fully explain/justify your answers to all questions in this course, unless otherwise instructed!

Assigned Questions

(1) Find, with proof, all $s \in \mathbb{R}$ so that the equation $x^2 - 2sx + 4s = 0$ has no solutions.

(2) For what value of a the expression $x_1^2 + x_2^2$ takes the minimum value where x_1, x_2 satisfy the equation $x^2 - ax + (a-1) = 0$.

(3) Prove that for all $s, t \in \mathbb{R}$ we have $st < \left(\frac{4s+9t}{}\right)^2$.