

Quiz 3 Proposal Version 3

1. Consider the equation
 $4x^5 - 3x^4 + 3x^3 - 2x^2 + x + 15 = 0$.
- (a) What does the rational root theorem predict for possible rational roots of the equation?
 - (b) What are the possibilities for the number of positive (real) roots of the equation?
 - (c) What are the possibilities for the number of negative (real) roots of the equation?
 - (d) Do your results in parts (b) and (c) reduce the possible rational roots in part (a)? If so, what are the possible rational roots now?
 - (e) Do your results in parts (b) and (c) predict that the equation has complex roots? If so, what are the possibilities for the number of complex roots?
 - (f) What is the largest absolute value for any real root of the equation?
 - (g) What is the largest modulus for any complex root of the equation?
 - (h) Does the result in part (f), further reduce the possible rational roots in part (d). If so, what are the possible rational roots now?
 - (i) If you knew that $z = a + bi$ is a root of the equation, could you predict another root? Explain.
- 2 Prove or disprove the following conjecture: If \mathbf{A} and \mathbf{B} are square matrices of the same size, then $\mathbf{AB}=\mathbf{BA}$.