

Name: _____

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Worksheet - Sep. 26

MAT 3501

Fall 2017

1. You are told that the equation $2x^4 + x^3 - x^2 + x - 3 = 0$ has two rational roots. Use the rational root theorem to make a short list of candidates and find at least one of the rational roots. (Not to spend too much time with computations, I'll tell you the other provided that your short list is fine.)

(b) Now use part (a) to find all roots (real or complex) of the equation $2x^4 + x^3 - x^2 + x - 3 = 0$

2. (a) Use the rational root theorem to show that $\sqrt[3]{5}$ is irrational.

(b) Use the rational root theorem to show that if n is not a perfect square then \sqrt{n} is irrational.

3. Let $f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$ be a polynomial with integer coefficients. Show that if a_0, a_n and $f(1)$ are odd, then $f(x) = 0$ has no rational roots.