Problems PreCal 1508 PLTL Workshop, September 16, 2011
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1. For the polynomials below, determine if a is a solution through synthetic division.

   (a) $f(x) = 3x^2 - 17x^2 + 15x - 25, \quad a = 5$

2. Is $(2x - 1)$ a factor of $6x^6 + x^5 - 92x^4 + 45x^3 + 184x^2 + 4x - 48$?

3. Are all real numbers complex numbers? Are all complex numbers real?

4. For the following complex numbers, find $z \cdot w$ and $z + w$

   (a) $z = 2 + 3i, \quad w = -1 - \sqrt{-2}$

   (b) $z = x + yi, \quad w = a + bi$

5. Find all zeros (including complex ones) of $f(x) = x^2 + x + 2$

6. If z is a complex number, $\bar{z}$ often denotes its conjugate. If $w = 3 - 7i$ what is $\bar{w}$? $w \cdot \bar{w}$?

7. Write $\frac{2+3i}{i-1}$ in *standard form* $(a + bi)$.

8. What is i^3? i^{20}? i^n for a positive integer n?

9. If $z \in \mathbb{C}$ is a root of $p(x) = ax^2 + bx + c$, is $\bar{z}$ also a root? *Hint : think of the quadratic formula*

Notation 1. *The following symbols are often used to denote certain sets.* $\mathbb{C}$ *= Complex numbers,* $\mathbb{R}$ *= Real numbers,* $\mathbb{N}$ *= Natural numbers (Integers greater than 0),* $\mathbb{Z}$ *= Integers,* $\mathbb{Q}$ *= Rational numbers (fractions with numerator and denominator in* $\mathbb{Z}$