Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Rational Zeros	• Recall that a polynomial function of degree n can have at most _____ real zeros. • Real zeros can be _____ or _____. • Rational zeros are those that can be written in the form of a _____.
Rational Zero Theorem	The **Rational Zero Theorem** can be used to determine all possible *rational* zeros of a polynomial function. If $f(x) = a_n x^n + a_{n-1}x^{n-1} + \ldots + a_1 x + a_0$ has integer coefficients, then every rational zero of the function has the following form: $\frac{p}{q} =$ _____
List Possible Rational Zeros	**Directions:** List all possible rational zeros of each function.

1. $f(x) = x^3 + 2x^2 - x + 2$	**2.** $f(x) = x^5 + 9x^3 - 2x^2 - 18$
3. $f(x) = 4x^3 - 4x^2 - x + 1$	**4.** $f(x) = 3x^3 - x^2 - 18x + 16$
5. $f(x) = 6x^5 - 8x^3 + 9x^2 - 12$	**6.** $f(x) = 2x^3 + 11x^2 + 28x + 24$

Finding Rational Zeros

- **Step 1:** List all possible rational zeros using the **Rational Zero Theorem.**
- **Step 2:** Test the zeros using **synthetic substiution.**
- **Step 3:** When you find a zero that works, use the remainder to completely factor the polynomial. Then find the zeros.

Directions: List all possible rational zeros. Then, find the actual zeros.

7. $f(x) = x^3 + 3x^2 - 6x - 8$

8. $f(x) = x^3 - 21x + 20$

9. $f(x) = x^4 + 3x^3 - 7x^2 - 27x - 18$

10. $f(x) = 2x^3 - 5x^2 - x + 6$

11. $f(x) = 4x^3 + 21x^2 + 32x + 15$

12. $f(x) = 3x^3 - 8x^2 - 33x - 10$

13. $f(x) = x^4 + x^3 - 31x^2 - 61x - 30$

14. $f(x) = x^4 - x^3 - 12x^2 + 28x - 16$