Algebra 2/Trig Name _____

Polynomial and Synthetic Division: Remainder and Factor Theorems Block____ Date _____

Use the remainder and factor theorems to determine the following zeros. Use that knowledge to help find the other zeros using an algebraic method (synthetic division, factoring, quadratic formula, etc.). If it cannot be done algebraically, then use your graphing calculator.

1. $f(x) = x^4 + x^3 - 18x^2 + 2x - 40$

2. $f(x) = x^3 - 2x + 4$

3. $f(x) = 3x^3 + 6x$

4. $f(x) = x^2 + 5x - 4$

5. $f(x) = x^3 + 3x^2 - 5x - 15$

6. $f(x) = 6x^3 - 31x^2 + 25x + 12$

7. $f(x) = x^4 + 2x^3 - 14x^2 - 13x + 30$

8. $f(x) = 4x^3 - x + 8x^2 - 2$

2.5 Rational Root Theorem:

Without using a graphing calculator find the roots to the following equation.

$f(x) = 2x^4 - 3x^3 - 21x^2 - 2x + 24$

Rational Root Theorem

1. List all possible p values (factors of p) (last term)
2. List all possible q values (factors of q) (first term)
3. List all possible roots $\frac{p}{q}$
4. Test the roots using the remainder theorem.
5. Use synthetic division for the roots that work
6. Repeat (you may also use any other possible algebraic method)

Practice Problems:

1. $f(x) = x^4 - 3x^2 + 2$

2. $f(x) = 4x^3 - 8x^2 + x + 3$

3. $f(x) = x^3 + 6x^2 - 13x - 6$

4. $f(x) = 36x^4 - 13x^2 + 1$

5. $f(x) = x^3 - 9x^2 + 27x - 27$

6. $f(x) = x^4 - 3x^3 - 11x^2 + 3x + 10$

7. $f(x) = 2x^3 + 3x^2 + 5x + 2$

8. $f(x) = 2x^3 - 7x^2 + 4x + 3$

9. $f(x) = 2x^3 + x^2 - 1$

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

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7. $f(x) = 2x^3 + 3x^2 + 5x + 2$

8. $f(x) = 2x^3 - 7x^2 + 4x + 3$

9. $f(x) = 2x^3 + x^2 - 1$

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