Copy and complete the following in the appropriate space on your graphic organizer. Use synthetic substitution!

1. Evaluate $f(x) = 4x^4 + 2x^3 - x + 7$ when $x = -2$.

2. Divide: $(2x^4 + 3x^3 + 3x + 17) \div (x + 2)$

3. Find the zeros of the function $f(x) = 12x^3 + 8x^2 - 13x + 3$ given that ½ is one of the zeros.

4. Factor $f(x) = 3x^3 - 11x^2 - 6x + 8$ given that $(x - 4)$ is one factor.

Copy and complete the following in the appropriate space on your graphic organizer. Use synthetic substitution!

1. Evaluate $f(x) = 4x^4 + 2x^3 - x + 7$ when $x = -2$.

   answer: f(-2) = _____

2. Divide: $(2x^4 + 3x^3 + 3x + 17) \div (x + 2)$

   answer: polynomial quotient w/ remainder?

3. Find the zeros of the function $f(x) = 12x^3 + 8x^2 - 13x + 3$ given that ½ is one of the zeros.

   answer: x = _____ x = _____ x = _____

4. Factor $f(x) = 3x^3 - 11x^2 - 6x + 8$ given that $(x - 4)$ is one factor.

   answer: (x)(x)(x)

Evaluating Polynomial Functions

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

Dividing Polynomials

Divide: $(2x^4 + 3x^3 + 3x + 17) \div (x + 2)$

Uses for Synthetic Substitution/Division

Finding Zeros of a Function

Find the zeros of the function $f(x) = 12x^3 + 8x^2 - 13x + 3$ given that ½ is one of the zeros.

Factoring a Polynomial

Factor $f(x) = 3x^3 - 11x^2 - 6x + 8$ given that $(x - 4)$ is one factor.

Evaluating Polynomial Functions

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

$-2 \mid 4 \;\; 2 \;\; 0 \;\; -1 \;\; 7$

$\qquad\quad -8 \;\; 12 \;\; -24 \;\; 50$

$4 \;\; -6 \;\; 12 \;\; -25 \mid 57$

$f(-2) = 57$

Dividing Polynomials

Divide: $(2x^4 + 3x^3 + 3x + 17) \div (x + 2)$

$-2 \mid 2 \;\; 3 \;\; 0 \;\; 3 \;\; 17$

$\qquad\quad -4 \;\; 2 \;\; -4 \;\; 2$

$2 \;\; -1 \;\; 2 \;\; -1 \mid 19$

$2x^3 - x^2 + 2x - 1 + \frac{19}{x+2}$

Uses for Synthetic Substitution/Division

Finding Zeros of a Function

Find the zeros of the function $f(x) = 12x^3 + 8x^2 - 13x + 3$ given that ½ is one of the zeros.

$\frac{1}{2} \mid 12 \;\; 8 \;\; -13 \;\; 3$

$\qquad\quad 6 \;\; 7 \;\; -3$

$12 \;\; 14 \;\; -6 \mid 0$

$12x^2 + 14x - 6 = 0$

$6x^2 + 7x - 3 = 0$

$(3x - 1)(2x + 3) = 0$

$x = \frac{1}{2}, \frac{1}{3}, -\frac{3}{2}$

Factoring a Polynomial

Factor $f(x) = 3x^3 - 11x^2 - 6x + 8$ given that $(x - 4)$ is one factor.

$4 \mid 3 \;\; -11 \;\; -6 \;\; 8$

$\qquad\quad 12 \;\; 4 \;\; -8$

$3 \;\; 1 \;\; -2 \mid 0$

$3x^2 + x - 2 = 0$

$(x - 4)(3x - 2)(x + 1)$