SYNTHETIC DIVISION WORKSHEET

- Don't forget ZERO Coefficients for missing degrees
- Solve the binomial divisor equal to zero.
- Multiply and Add Patterns
- If zero value is a fraction, then divide all coefficients by denominator.

1) **Perform the following divisions using Synthetic Division.**
Is the binomial divisor a factor of the polynomial?

A. $(p^4+5p^3-11p^2-25p+29)\div(p+6)$

B. $(y^4-8y^3+10y^2+2y+4)\div(y-2)$

C. $(8v^5+32v^4+5v+20)\div(v+4)$

D. $(3x^3-4x^2-17x+6)\div(3x-1)$

E. $(4v^3+6v^2-8v-12)\div(2v-3)$

F. $(6z^3+5z^2-3z-2)\div(2x+1)$

2) **Completely FACTOR each polynomial given a known factor.**
What are all of the zeros of the polynomial?

A. $x^3+9x^2+23x+15;\ \ x+5$

B. $x^3-x^2-14x+25;\ \ x-3$

C. $25x^3+150x^2+131x+30;\ \ 5x+3$

D. $6x^3+7x^2-1;\ \ 2x+1$

3) **For each polynomial, LIST all POSSIBLE RATIONAL ROOTS.**
- Find all factors of the leading coefficient and constant value of polynomial.
- ANY RATIONAL ROOTS = ± (Constant Factor over Leading Coefficient Factor)

A. $x^5+7x^3-3x-12$ B. $x^4+2x^3-8x^2+16x-32$ C. x^3+27

D. $6x^3+7x^2-3x-1$ E. $3x^2+2x+2$ F. $4x^2-9$

4) **Completely FACTOR and find all zeros for each polynomial:**
- List all POSSIBLE RATIONAL ZEROS (Section #3)
- Use Synthetic Division to check each zero. (Section #2)
- When you reach a quadratic equation, perform regular factoring or Quadratic Formula.

A. x^3+4x^2+5x+2 B. $x^4-x^3+14x^2-16x-32$

C. $5x^3+29x^2+19x-5$ D. $4x^3-9x^2+6x-1$

E. $3x^4-10x^3-24x^2-6x+5$ F. $3x^3+9x^2+4x+12$