College Algebra **Name:** _____

Unit 2 LT 4 Practice Day 1 **Date:** _____ **Period:** _____

Use synthetic division to find all zeros of the polynomial function. Then, rewrite the function in factored form.

1.) $f(x) = x^3 - 7x + 6; (x = -3)$

$$\begin{array}{r|rrrr} -3 & 1 & 0 & -7 & 6 \\ + & \downarrow & -3 & 9 & -6 \\ \hline & 1 & -3 & 2 & 0 \end{array}$$

$1x^2 - 3x + 2$

$(x-2)(x-1)$

Factored Form: $f(x) = (x+3)(x-2)(x-1)$

Zero(s): $x = -3, 2, 1$

2.) $f(x) = 5x^2 - 17x - 12;\ (x-4)$

$$\begin{array}{r|rrr} 4 & 5 & -17 & -12 \\ + & \downarrow & 20 & 12 \\ \hline & 5 & 3 & 0 \end{array}$$

$5x + 3$

Factored Form: $f(x) = (x-4)(5x+3)$

Zero(s): $x = 4, -3/5$

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

$$\begin{array}{r|rrrr} 2 & 1 & 4 & -4 & -16 \\ + & \downarrow & 2 & 12 & 16 \\ \hline & 1 & 6 & 8 & 0 \end{array}$$

$x^2 + 6x + 8$

$(x+4)(x+2)$

Factored Form: $f(x) = (x-2)(x+4)(x+2)$

Zero(s): $x = 2, -4, -2$

4.) The volume of a rectangular prism is $4x^3+16x^2-23x-15$. Find the length and width if the height is $(x+5)$. Write your answer in factored form.

$$\begin{array}{r|rrrr} -5 & 4 & 16 & -23 & -15 \\ + & \downarrow & -20 & 20 & 15 \\ \hline & 4 & -4 & -3 & 0 \end{array}$$

$4x^2-4x-3$

$\boxed{(2x-3)(2x+1)}$

5.) The area of a rectangle is $2x^4-8x^3+13x^2-28x+21$. Find the length if the width is $(x-1)$. Write your answer in factored form.

$$\begin{array}{r|rrrrr} 1 & 2 & -8 & 13 & -28 & 21 \\ + & \downarrow & 2 & -6 & 7 & -21 \\ \hline & 2 & -6 & 7 & -21 & 0 \end{array}$$

$(2x^3-6x^2)+(7x-21)$

$2x^2(x-3)+7(x-3)$

$\boxed{(2x^2+7)(x-3)}$

6.) Find the key information and graph the following function.

$f(x)=x^3-5x^2+2x+8$

Degree 3

Zero(s): $x=-1, 2, 4$

Relative Max: $(0.2, 8.2)$

Relative Min: $(3.1, -4.1)$

End Behavior: $x\to\infty$ $f(x)\to\infty$

$x\to-\infty$ $f(x)\to-\infty$

Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$