Name: KEY

Show all work. Make sure your answers are clearly circled, and write neatly.

1	Factor the following polynomial: $x^3 - 27$ $x^3 - 3^3$	Answer: $(x-3)(x^2+3x+9)$
2	Factor the following polynomial: $x^3 + 8$ $x^3 + 2^3$	Answer: $(x+2)(x^2-2x+4)$
3	Factor the following polynomial: $125 - x^3$ $5^3 - x^3$	Answer: $(5-x)(25+5x+x^2)$
4	Factor the following polynomial: $8x^3 + 125$ $(2x)^3 + 5^3$	Answer: $(2x+5)(4x^2-10x+25)$
5	Factor the following polynomial: $8x^3 - 64$ $(2x)^3 - 4^3$	Answer: $(2x-4)(4x^2+8x+16)$
6	Factor the following polynomial: $x^3 + 64$ $x^3 + 4^3$	Answer: $(x+4)(x^2-4x+16)$
7	Find all the zeros of the function using the calculator. Round to the nearest tenths place. Also use your calculator to find any relative or absolute minimum or maximum values. $f(x) = x^3 - 2x^2 + 1$	a. List all zeros of the function as ordered pairs: $(-.61, 0)$, $(1, 0)$, $(1.61, 0)$ b. List any relative minimum values as ordered pairs, or write N/A if there are not any. $(1.\overline{3}, -.18)$ c. List any absolute minimum values as ordered pairs, or write N/A if there are not any. N/A d. List any relative maximum values as ordered pairs, or write N/A if there are not any. $(0, 1)$ e. List any absolute maximum values as ordered pairs, or write N/A if there are not any. N/A

8 Find all the zeros of the function using the calculator. Round to the nearest tenths place. Also use your calculator to find any relative or absolute minimum or maximum values.

$f(x) = -x^2 - 6x - 7$

a. List all zeros of the function as ordered pairs:

$(-4.4, 0)$, $(-1.6, 0)$

b. List any relative minimum values as ordered pairs, or write N/A if there are not any.

N/A

c. List any absolute minimum values as ordered pairs, or write N/A if there are not any.

N/A

d. List any relative maximum values as ordered pairs, or write N/A if there are not any.

N/A

e. List any absolute maximum values as ordered pairs, or write N/A if there are not any.

$(-3, 2)$

9 Draw a third degree polynomial with a positive leading coefficient, and zeros of the function at -2, 3, and 5.

$x = -2$ $\quad x = 3$ $\quad x = 5$

$+2 \quad +2$ $\quad (x-3)$ $\quad (x-5)$

$(x+2) = 0$

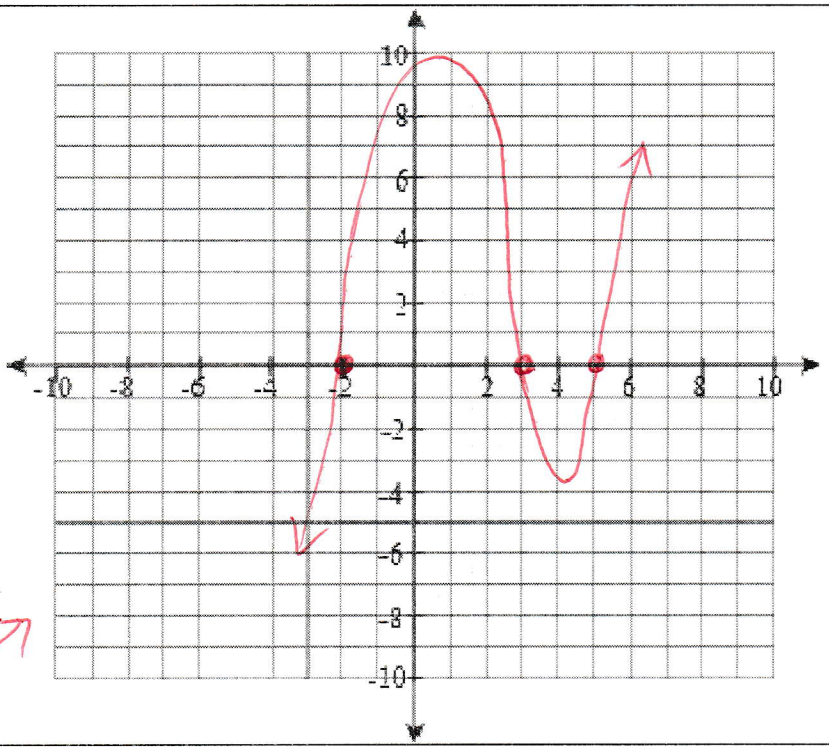
$(x+2)(x-3)(x-5)$

	x	$+2$
x	x^2	$2x$
-3	$-3x$	-6

$(x^2 - x - 6)(x-5)$

	x^2	$-x$	-6
x	x^3	$-x^2$	$-6x$
-5	$-5x^2$	$+5x$	$+30$

$x^3 - 6x^2 - x + 30$



10 Write the polynomial function of least degree with integral coefficients that has the given zeros. Write the equation in standard form.

$x = 1, 2, -3$

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

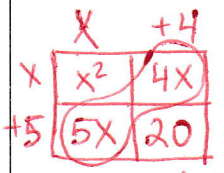
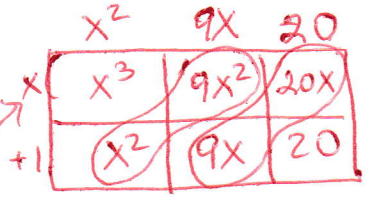
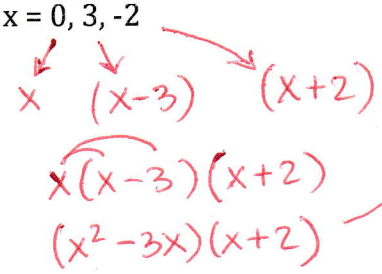
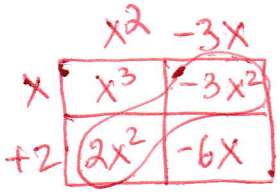
	x	-1
x	x^2	$-x$
-2	$-2x$	$+2$

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

Equation:

	x^2	$-3x$	$+2$
x	x^3	$-3x^2$	$+2x$
$+3$	$+3x^2$	$-9x$	$+6$

$x^3 - 7x + 6$

11	Write the polynomial function of least degree with integral coefficients that has the given zeros. Write the equation in standard form. x = -4, -5, -1 $(x+4)(x+5)(x+1)$  $(x^2+9x+20)(x+1)$	Equation:  $x^3+10x^2+29x+20$
12	Write the polynomial function of least degree with integral coefficients that has the given zeros. Write the equation in standard form. x = 0, 3, -2  $x(x-3)(x+2)$ $(x^2-3x)(x+2)$	Equation:  x^3-x^2-6x
13	The volume of a rectangular prism is represented by the expression $x^3 - x^2 - 8x + 12$ If the length is (x + 3) And the height and width are equal, what is the width of the prism? Express your answer as a binomial. $V = LWH$ $x+3=0$ $-3 \quad -3$ $x = -3$	Width of the prism? $-3 \mid 1 \quad -1 \quad -8 \quad 12$ $\downarrow \quad -3 \quad 12 \quad -12$ $1 \quad -4 \quad 4 \quad 0$ $x^2 - 4x + 4$ 4 $-2 \quad -2$ -4 $(x-2)(x-2)$ $W = (x-2)$

14	The volume of a rectangular prism is represented by the expression $x^3 + 4x^2 - 35x - 150$ If the length is $(x - 6)$ And the height and width are equal, what is the width of the prism? Express your answer as a binomial. $V = LWH$ $x - 6 = 0$ $+6 \quad +6$ $x = 6$	Width of the prism? $6 \mid 1 \quad 4 \quad -35 \quad -150$ $\downarrow \quad 6 \quad 60 \quad 150$ $1 \quad 10 \quad 25 \quad 0$ $x^2 + 10x + 25$ 25 → 5, 5; 5 + 5 = 10 $(x+5)(x+5)$ $W = (x+5)$
15	The volume of a rectangular prism is represented by the expression $x^3 - 2x^2 - 15x + 36$ If the length is $(x + 4)$ And the height and width are equal, what is the width of the prism? Express your answer as a binomial. $V = LWH$ $x + 4 = 0$ $-4 \quad -4$ $x = -4$	Width of the prism? $-4 \mid 1 \quad -2 \quad -15 \quad 36$ $\downarrow \quad -4 \quad 24 \quad -36$ $1 \quad -6 \quad 9 \quad 0$ $x^2 - 6x + 9$ 9 → −3, −3; −3 + −3 = −6 $(x-3)(x-3)$ $W = (x-3)$