Name: Key Period: _____

Math 3 Unit Three Review
SHOW ALL WORK!!

Factor the following polynomials completely over the integers.

1- $x^2-8x+16$

$(x-4)(x-4)$

2- $4x^2+16x+12$

GCF: 4

$4(x^2+4x+3)$

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

3- $2x^2+17x+30$

$(2x+5)(x+6)$

4- $3x^2+24x+36$

$3(x^2+8x+12)$

$3(x+6)(x+2)$

5- $2x^2-11x+5$

$(2x-1)(x-5)$

6- x^4+8x^2-48

$(x^2+12)(x^2-4)$

$(x^2+12)(x-2)(x+2)$

7- $2x^3+8x^2-6x-24$ GCF: 2

$2[x^3+4x^2-3x-12]$

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

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

8- x^3-27

$a=x$

$b=3$

$(x-3)(x^2+3x+9)$

9- $4x^3-x^2-36x+9$

$x^2(4x-1)-9(4x-1)$

$(4x-1)(x^2-9)$

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

Factor the following polynomials using synthetic division to start.

10- x^3+4x^2+5x+2

-1 | 1 4 5 2

↓ -1 -3 -2

1 3 2 0

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

$(x+1)(x+2)(x+1)$

11- $3x^3+8x^2-5x-6$

1 | 3 8 -5 -6

↓ 3 11 6

3 11 6 0

$(x-1)(3x^2+11x+6)$

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

12- $3x^3+13x^2+2x-8$

-1 | 3 13 2 -8

↓ -3 -10 8

3 10 -8 0

$(x+1)(3x^2+10x-8)$

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

Factor the following polynomials using any method.

13- $3x^4 - x^3 + 3x - 1$

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

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

$a=x$, $b=1$

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

14- $x^3 - 7x + 6$

3 is not twice as big as 1, so we use Synthetic!

1	1	0	-7	6
		1	1	-6
	1	1	-6	0

$(x-1)(x^2+x-6)$

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

15- $2x^3 - 5x^2 + 18x - 45$

$x^2(2x-5)+9(2x-5)$

$(2x-5)(x^2+9)$

Factor the following polynomials completely.

16- $64x^4 - 9$

$(8x^2-3)(8x^2+3)$

17- $x^4 + 7x^2 + 10$

$(x^2+5)(x^2+2)$

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

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

Solve each polynomial equation ~~over the real numbers~~.

19- $x^3 + 17x^2 + 30x = 0$

$x(x^2+17x+30)$

$x(x+15)(x+2)=0$

$x=0$, $x=-15$, $x=-2$

20- $x^5 - 4x^3 + 4x = 0$

$x(x^4-4x^2+4)=0$

$x(x^2-2)(x^2-2)$

$x=0$

$x^2-2=0$

$x^2=2$

$x=\pm\sqrt{2}$

21- $2x^3 - 3x^2 - 32x + 48 = 0$

$x^2(2x-3)-16(2x-3)$

$(2x-3)(x^2-16)$

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

$x=3/2$, $x=4$, $x=-4$

Solve each polynomial equation over the complex numbers.

22- $5x^3 - 40 = 0$

$5(x^3-8)=0$

$a=x$, $b=2$

$5(x-2)(x^2+2x+4)=0$

$x=2$

$x=\frac{-2\pm\sqrt{2^2-4(1)(4)}}{2(1)}$

$x=\frac{-2\pm\sqrt{-12}}{2}$

$x=\frac{-2\pm 2i\sqrt{3}}{2}$

$x=-1\pm i\sqrt{3}$

23- $x^4 - 7x^2 = 18$

$x^4-7x^2-18=0$

$(x^2-9)(x^2+2)=0$

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

$x=3$, $x=-3$

$x^2+2=0$

$x^2=-2$

$x=\pm i\sqrt{2}$