Unit 9 Review

#1 $(b^3-3b^2)+(-7b+21)$ Factor by grouping

$b^2(b-3)-7(b-3)$

$(b-3)(b^2-7)=0$

$b=3, \pm\sqrt{7}$

$b^2-7=0$

$\sqrt{b^2}=\sqrt{7}$

$b=\pm\sqrt{7}$

#2. $(3r^3-6r^2)+(4r-8)$ Factor by grouping

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

$(r-2)(3r^2+4)=0$

$r=2$

$3r^2+4=0$

$\frac{3r^2}{3}=-\frac{4}{3}$

$\sqrt{r^2}=\sqrt{-\frac{4}{3}}$

$r=\pm i\sqrt{\frac{4}{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}$

$r=\pm\frac{i\sqrt{12}}{3}=\pm\frac{2i\sqrt{3}}{3}$

#3. ① $x^4 + 27x$ GCF

$x(x^3 + 27)$ Sum of Cubes $(a+b)(a^2-ab+b^2)$

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

② $x^4 - 8x^2 + 16$ Trinomial

$(x^2 - 4)(x^2 - 4)$ Difference of Squares

$(x-2)(x+2)(x-2)(x+2)$

③ $x^4 + x^2 - 12$

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

$4x^2$

$-3x^2$

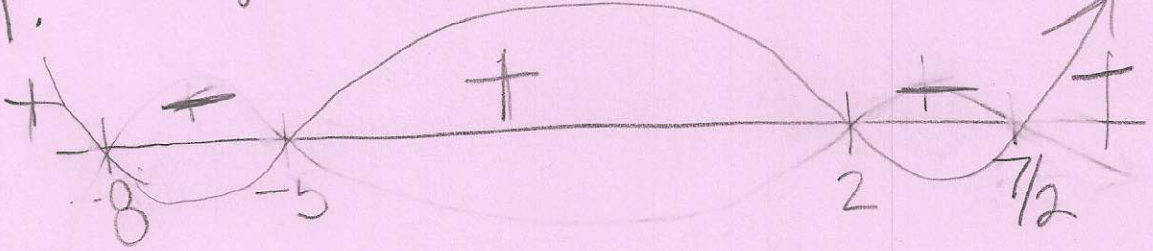
x^2

#4. 4th degree, opening up. Looking for < 0

$-2x + 7 = 0$

$\frac{-2x}{-2} = \frac{-7}{-2}$

$x = \frac{7}{2} = 3.5$



$(-\infty, -8) \cup (-5, 2) \cup (\frac{7}{2}, \infty)$

$(-8, -5) \cup (2, 7/2)$

#5

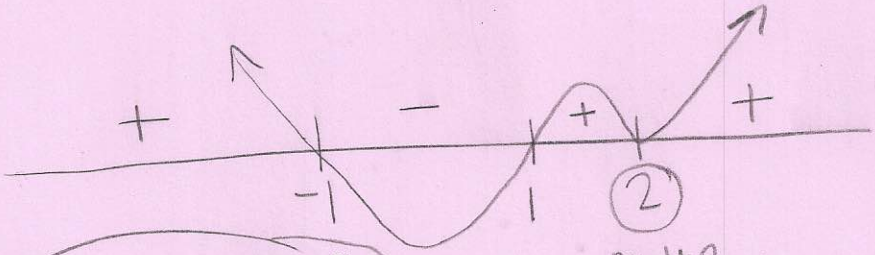
2	1	-4	3	4	-4
	↓	2	-4	-2	4
	1	-2	-1	2	0

2	1	-2	-1	2	0
	↓	2	0	-2	
	1	0	-1	0	

4th degree opening up.
≤ 0

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

Zeros: 2 (mult. 2), -1, 1



$[-1, 1] \cup [2]$

#6

$(4 + \sqrt{-4}) - (3 - \sqrt{-9})$

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

$1 + 5i$

$(-2 + \sqrt{-12}) + (3 - \sqrt{-27})$

$(-2 + 2i\sqrt{3}) + (3 - 3i\sqrt{3})$

$1 - 3i\sqrt{3}$

#7 $(2-3i)(2+3i)$ * Complex Conjugates multiplied give real ans.

$= 4+6i-6i-9i^2$

$= 4+9$

$= 13$

$(6+2i)(3-5i)$

$18-30i+6i-10i^2$

$18-24i+10$

$28-24i$

#8 $\frac{-3}{2i}\cdot\frac{-2i}{-2i} = \frac{6i}{-4i^2} = \frac{6i}{4} = \frac{3i}{2}$

$\frac{2+3i}{3-4i}\cdot\frac{(3+4i)}{(3+4i)} = \frac{6+8i+9i+12i^2}{9+16}$

$= \frac{6+17i-12}{25}$

$= \frac{-6+17i}{25}$

#9)

$2i$	1	3	-6	12	-40
	↓	$2i$	$-4+6i$	$-12-20i$	40
	1	$3+2i$	$-10+6i$	$-20i$	0
$-2i$	↓	$-2i$	$-6i$	$20i$	
	1	3	-10	0	

$x^2+3x-10 = (x+5)(x-2)$

Zeros: $-5, 2, -2i, 2i$

#10 $g(x) = x^4 - 81$ (Special factoring)

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

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

$x^2+9=0$

$\sqrt{x^2} = \sqrt{-9}$

$x = \pm 3i$

Zeros: $3, -3, 3i, -3i$