Pre-Calculus A Name key Hour _____

2.4-2.5 Review

1) Verify (x + 4) is a factor of $f(x) = x^3 - 28x - 48$. Find all the other factors of f(x), and then find the zeros.

-4	1	0	-28	-48
		-4	16	48
	1	-4	-12	0 ✓

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

$\boxed{f(x) = (x+4)(x-6)(x+2)}$

$x+4=0$ $x-6=0$ $x+2=0$

Zeros: $\boxed{-4, 6, -2}$

2) Use the remainder theorem (synthetic division) to evaluate $g(x) = 2x^6 + 3x^4 - x^2 + 3$ for g(2).

2	2	0	3	0	-1	0	3
		4	8	22	44	86	172
	2	4	11	22	43	86	$\boxed{175}$

$\boxed{g(2) = 175}$

3) A polynomial has zero a zero at -1 and 4i. A) Write in factored form. B) Write in standard form.

& -4i

A) $\boxed{(x+1)(x-4i)(x+4i)}$

B) $(x+1)(x^2+4ix-4ix-16i^2)$

$(x+1)(x^2+16)$

$\boxed{f(x) = x^3+x^2+16x+16}$

4) Let (x + 2) and (x – 4) be factors of $f(x) = 8x^4 - 14x^3 - 71x^2 - 10x + 24$. Find all the other factors and zeros.

-2	8	-14	-71	-10	24
		-16	60	22	-24
	8	-30	-11	12	0

4	8	-30	-11	12
		32	8	-12
	8	2	-3	0

$(x+2)(x-4)(8x^2+2x-3)=0$

$\boxed{(x+2)(x-4)(4x+3)(2x-1)=0}$ ← All Factors

$x+2=0$ $x-4=0$ $4x+3=0$ $2x-1=0$

Zeros: $\boxed{-2, 4, \frac{-3}{4}, \frac{1}{2}}$

& $-3-i$

5) If (-3 + i) is a zero of $g(x) = 4x^3 + 23x^2 + 34x - 10$. Find all the other zeros.

$(x-(-3+i))\ (x-(-3-i))$

$(x+3-i)(x+3+i)$

$\cancel{x^2}+3x+\cancel{ix}+\cancel{3x}+9+\cancel{3i}-\cancel{ix}-\cancel{3i}-i^2$

$x^2+6x+10$

$$\begin{array}{r} 4x-1 \\ x^2+6x+10\overline{)4x^3+23x^2+34x-10} \\ -(4x^3+24x^2+40x) \\ \hline -x^2-6x-10 \\ -(-x^2-6x-10) \\ \hline 0 \end{array}$$

$g(x)=(x^2+6x+10)(4x-1)=0$

$x^2+6x+10=0 \qquad 4x-1=0$

$$\boxed{\begin{array}{ll} -3+i & x=\frac{1}{4} \\ -3-i & \end{array}}$$

Zeros

6) Find all of the zeros: $x^2 + 4x - 1 = 0$

$a=1 \quad b=4 \quad c=-1$

$$x=\frac{-4\pm\sqrt{16-4(1)(-1)}}{2}$$

$$\frac{-4\pm\sqrt{20}}{2}=\frac{-4}{2}\pm\frac{2\sqrt{5}}{2}$$

$$x=\boxed{-2\pm\sqrt{5}}$$

$\sqrt{20}=\sqrt{4}\cdot\sqrt{5}$

$2\sqrt{5}$

7) Perform the following; write the answer in standard form.

a. $(3 + 2i) - (5 + 7i)$

$\boxed{-2-5i}$

b. $(4+\sqrt{-18})+(8-\sqrt{-32})$

$\boxed{12-i\sqrt{2}}$

$\frac{\sqrt{-18}}{3i\sqrt{2}} \qquad \frac{\sqrt{-32}}{4i\sqrt{2}}$

c. $\frac{6+2i}{3-i}\ \frac{3+i}{3+i}$

$$\frac{18+6i+6i+2i^2}{9-i^2}$$

$$\frac{18+12i-2}{9+1}$$

$\frac{8}{5}+\frac{6}{5}i=\boxed{\frac{16}{10}+\frac{12}{10}i}$