ALGEBRA II REVIEW PROBLEMS
(Chapter 6)

1. **Write a polynomial described below in standard form:**

a. A cubic trinomial **b.** A quadratic binomial

2. **Write a polynomial *equation* with rational coefficients in standard form given the following zeros:**

a. $5, \sqrt{3}$ **b.** $4, 3 + i$

3. **Divide** $(x^3 - 5x^2 + 12)$ **by** $(x - 2)$ **using long division**

4. **Divide** $(x^4 - x^3 + x^2 - x + 1)$ **by** $(x + 1)$ **using synthetic division**

5. **Use synthetic division and the Remainder Theorem to find P(2) if** $P(x) = x^4 - 3x^3 + 3x - 4$

6. **If** $2x^5 + x^4 + x^3 - x^2 - 9x - 42 = 0$**, then answer the following:**

a. Use Descartes's Rule of Signs to determine the number of possible positive and negative real roots

b. List all possible rational roots

c. State the number of complex roots and possible number of real roots

7. **Solve the following over the set of Complex numbers:**

a. $x^3 - 64 = 0$ **b.** $x^3 - 6x^2 + 8x = 0$ **c.** $x^4 - 29x^2 = -100$

8. **Find all zeros of** $f(x) = x^3 + 2x^2 + 2x + 4$

ANSWERS

1a. $x^3 - 4x + 2$ (Answer may vary)

1b. $x^2 - 4$ (Answer may vary)

2a. $(x - 5)(x - \sqrt{3})(x + \sqrt{3}) = 0$

$x^3 - 5x^2 - 3x + 15 = \mathbf{0}$

2b. $(x - 4)(x - (3 + i))(x - (3 - i)) = 0$

$x^3 - 10x^2 + 34x - 40 = \mathbf{0}$

3.

$$\begin{array}{r|l} & x^2 - 3x - 6 \\ \hline x - 2 & x^3 - 5x^2 + \mathbf{0x} + 12 \end{array}$$

4.

-1	1	-1	1	-1	1
		-1	2	-3	4
	1	-2	3	-4	5

$$x^3 - 2x^2 + 3x - 4 + \frac{5}{x+1}$$

5.

2	1	-3	0	3	-4
		2	-2	-4	-2
	1	-1	-2	-1	-6

P(2) = -6

6a. 1 possible **positive** real root; 0, 2 or 4 possible **negative** real roots

6b. $\pm 1, \pm 2, \pm 3, \pm 6, \pm 7, \pm 14, \pm 21, \pm 42, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{7}{2}, \pm \frac{21}{2}$

6c. 5 complex roots; 1, 3 or 5 real roots

7a. $x = 4, -2 \pm 2i\sqrt{3}$

7b. $x = 0, 2, 4$

7c. $x = 2, -2, 5, -5$

8. $x = -2, \pm i\sqrt{2}$