Algebra 3 **Name** _____
Quiz Review: 3.3, 3.5, 3.6

Divide using long division.

1. $(4x^3 - 2x^2 - 6x + 1) \div (2x + 1)$

2. $(2x^4 - 5x^2 - 6x + 7) \div (2x - 1)$

Divide using synthetic division.

3. $(x^2 - 2x - 15) \div (x - 5)$

4. $(x^3 - 3x^2 + x - 3) \div (x + 1)$

Use synthetic substitution (use the value provided with synthetic division and find the remainder) to evaluate each polynomial for the given value.

5. $8x^4 - 4x^2 + x + 4; x = -\frac{1}{2}$

Determine whether the given binomial is a factor of *P(x)*.

6. $P(x) = 4x^3 - 2x^2 - x + 1; (x + 4)$

7. $P(x) = x^4 - 2x^3 + x^2 - 3x + 2; (x - 2)$

Use the Fundamental Theorem of Algebra to determine how many roots the polynomial has?

8. $P(x) = x^5 - 6x^4 + 4x^3 + 17x^2 - 5x - 6$

9. $P(x) = 2x^4 - 4x^3 - 2x^2 + 3x - 5$

Use the Rational Roots Theorem to identify <u>all of the possible rational roots</u> of the polynomial.

10. $P(x) = x^5 + 4x^4 - x^3 - 9x^2 + 6$

11. $P(x) = 2x^3 - 5x^2 - 28x + 15$

Solve each of the polynomial equations by factoring or using the reverse binomial theorem. State the multiplicity of each root when applicable.

12. $x^4 - 16 = 0$

13. $x^4 - 11x^2 + 28 = 0$

14. $3x^5 - 3x^3 - 60x = 0$

15. $27x^3 + 135x^2 + 225x + 125 = 0$

Given the indicated roots of each polynomial, use the Irrational and Complex Conjugate Root Theorems to determine the remaining zeros.

16. $P(x)$ is a polynomial of degree four with zeros 2, 3 and $2i$

17. $P(x)$ is a polynomial of degree five with zeros -5, $-5 + 7i$, and $3 + \sqrt{2}$

Identify all of the roots (real and complex) of each equation.

18. $2x^3 + 7x^2 - 53x - 28 = 0$

19. $2x^3 + 17x^2 + 23x - 42 = 0$

20. $x^4 + 4x^3 + 13x^2 + 36x + 36 = 0$

21. $2x^4 - 13x^3 + 23x^2 - 52x + 60 = 0$

Write a polynomial with the given zeros.

22. $4,\ \frac{1}{2},\ \text{and}\ -3i$

23. $\sqrt{2}, -7, \text{and}\ 0$