**Name:_____**

**Algebra 2- Unit 7 Test Review**

1. Classify the polynomial: $2x^3 + 2$

2. Classify the polynomial: $33x^4 + 20x^2 - 12$

3. Determine the end behavior of $x^3 + 3x^2 - x$

4. Determine the end behavior of the graph of $f(x) = -x^2 + 4x - 12$

5. Determine the multiplicities of each zero: $(x-3)^2(x+1)^3$

6. Factor $y = x^4 - 9x^2 + 14$

7. Factor $y = 3x^4 - x^2 - 10$

8. Factor $y = x^3 - 5x^2 + 6x$

9. Factor $y = x^3 - 2x^2 - 23x + 60$ given (x-3) is a factor.

10. Factor $y = x^3 - 27$

11. Find **ALL** the roots. $x^4 - 3x^2 + 2 = 0$

12. Find **ALL** the roots. $x^4 - 7x^2 + 12 = 0$

For 13-18 use the following functions $f(x) = 2x^2 - 4x \quad g(x) = x - 5$

13. Find $(f+g)(x)$

14. Find $f(x) - g(x)$

15. Find $(f \cdot g)(x)$

16. Find $\frac{f(x)}{g(x)}$

17. Find $(g \circ f)(x)$

18. Find $g^{-1}(x)$

19. Determine the inverse of $f(x) = \frac{4x-9}{7}$

20. Factor $x^4 - 7x^2 + 10$

21. Find all roots of $x^4 - 7x^2 + 10 = 0$

For 22-25 and the bonus use:
$f(x) = 3x^2 + 4 \quad and \quad g(x) = 3x - 5$

22. Determine $f(x) + g(x)$

23. Determine $f(x) \cdot g(x)$

24. Determine $(g \circ f)(x)$

25. Determine $g^{-1}(x)$

26. Determine $\frac{g(x)}{f(x)}$

Formulas:

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$