Polynomials TEST REVIEW
Fundamentals of Algebra 2

Name: __________________________
Date: _______________   Hr: ______ __

Name the degree, leading coefficient, & type of each function.

1. \( f(x) = 10x^3 - x^2 - 12x + 4 \)
   \( d: \) _____   l.c.: _____
   type:_____________

2. \( g(x) = 9x - 4x^4 + 1 \)
   \( d: \) _____   l.c.: _____
   type:_____________

3. Add: \( (5x^2 - 9x + 8) + (-2x^2 - 5x + 7) \)

4. Subtract: \( (3x^3 - 10) - (5x^3 + x^2 + 6) \)

Multiply.

5. \(-3x(4x^2 - x - 7)\)

6. \((2x - 3)^2\)

7. \((x - 2)(x^2 + 7x - 10)\)

Factor completely.

8. \( x^3 + 3x^2 - x - 3 \)

9. \( x^4 - 6x^2 + 8 \)

10. \( 2x^5 - 18x \)

11. \( x^3 + 9x^2 + 20x \)
Get in factored form, and then find all solutions. The first is already factored for you.

12. \( x(x + 7)(x^2 + 25) = 0 \)

\[ x = \ldots \]
\[ x = \ldots \]
\[ x = \ldots \]
\[ x = \ldots \]

13. \( x^3 + 6x^2 - 9x - 54 = 0 \)

\[ x = \ldots \]
\[ x = \ldots \]
\[ x = \ldots \]
\[ x = \ldots \]

Sketch the graph of the polynomial function using the degree & leading coefficient.

14. \( f(x) = -x^3 + 4x^2 + 1 \)

15. \( f(x) = 2x^4 + 1 \)

16. \( f(x) = -12x^6 - 2x \)

17. \( f(x) = x^{123} + 4x^2 + 1 \)

Find the x-intercepts and y-intercept of the function. Then graph it using the degree/shape rules.

18. \( y = (x - 1)(x - 7)(x + 1) \)

19. \( y = x^4 + 2x^2 - 3 \)

20. Write an equation for the polynomial function with zeros \(-5\) and \(\pm 2i\).

factored form: _______________________________

standard form: _______________________________
Use the graph below to tell whether the statement is true or false.

21. The function’s degree is even.

22. The function’s leading coefficient is positive.

23. The constant term of the function is 6.

24. The function has a zero at $−1$.

25. One factor of the function is $(x + 2)$.

26. An equation for the polynomial could be: $f(x) = (x + 1)(x + 3)(x - 2)$.

27. Divide $\left(2x^3 - 11x^2 - 5x + 30\right) \div (x - 4)$ using synthetic or long division.

28. Show all work below to determine whether or not $4$ is a zero of the function $f(x) = x^3 + 4x^2 - x + 10$.

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No

Explain: __________________________________

29. If $(x + 2)$ is a factor of $f(x) = x^3 - 5x^2 - 2x + 24$, use division (long or synthetic) to rewrite $f(x)$ in factored form. Then name all of the zeros.

Factored form:

$f(x) =$ ______________________

Zeros: ______________________
30. If 7 is a zero of \( f(x) = x^3 - 18x^2 + 95x - 126 \), use division (long or synthetic) to rewrite \( f(x) \) in factored form. Then name all of the zeros.

Factored form:

\[
f(x) = \text{______________________________}
\]

Zeros: ________________

31. Given the polynomial function: \( f(x) = x^3 + 6x^2 + 5x - 12 \),

a. List all potential zeros. 
   
   ______________________________

b. Find all zeros using your list in part a & synthetic division.

Zeros: ________________