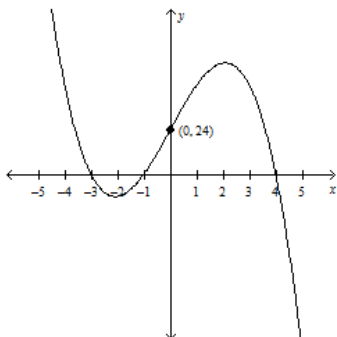


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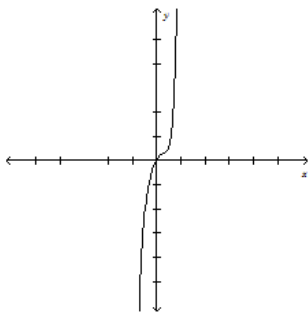
Algebra 2 Midterm Review

1. Consider the function $f(x) = -4x^2 - 8x + 10$. Determine whether the graph opens upward or downward. Find the vertex and the y-intercept. Graph the function.
2. Write a quadratic function in standard form with zeros 6 and -8 .
3. Write the function $f(x) = -5x^2 - 60x - 181$ in vertex form, and identify its vertex.
4. Find the zeros of the function $f(x) = x^2 + 6x + 18$.
5. Find the zeros of $f(x) = x^2 + 7x + 9$.
6. Find the zeros of $g(x) = 4x^2 - x + 5$.
7. Write a quadratic function that fits the points (0, 6), (2, 4), and (3, 6).
8. Subtract. Write the result in the form $a + bi$.
 $(5 - 2i) - (6 + 8i)$
9. Multiply $6i(4 - 6i)$. Write the result in the form $a + bi$.
10. Add. Write your answer in standard form.
 $(5a^5 - a^4) + (a^5 + 7a^4 - 2)$
11. Find the product $(5x - 3)(x^3 - 5x + 2)$.
12. Divide. $(x^2 - 9x + 10) \div (x - 2)$
13. Divide. $(4x^3 + 20x^2 + 17x - 10) \div (2x^2 + 3x - 2)$
14. Determine whether the binomial $(x - 4)$ is a factor of the polynomial $P(x) = 5x^3 - 20x^2 - 5x + 20$.
15. Write the simplest polynomial function with zeros 5, -4 , and $\frac{1}{2}$.
16. Identify the degree, and end behavior of the function $P(x) = -5x^4 - 6x^2 + 6$
17. Write the factored form equation for the graph.

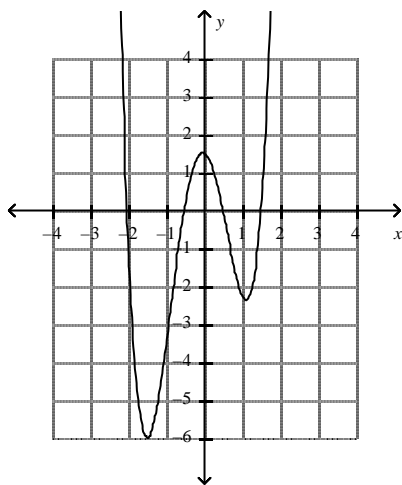


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18. Identify whether the function graphed has an odd or even degree and a positive or negative leading coefficient.



19. What quartic function does the graph represent?



20. Convert the quadratic function in factored form to standard form. $f(x) = 2(x - 4)(x + 1)$
21. Convert the quadratic function in vertex form to standard form. $f(x) = 3(x - 4)^2 + 7$
22. What is the degree of the function represented in the table?

x	-2	-1	0	1	2	3	4
y	3	1	1	3	7	13	21

23. Simplify each expression. $(4 - 5i)(8 + i)$
24. Sketch the graph of $f(x)$. $f(x) = (x - 3)(x + 2)(x - 1)$
25. Write a cubic function (as factors) with the given characteristics:
zeros: $(4, 0)$, $(-2, 0)$, $(-3, 0)$; y-intercept $(0, -12)$
26. Write a cubic function (as factors) with the given characteristics: zeros: $x = -3$, $x = 0$, $x = 1$
27. Is $x - 1$ a factor of $x^4 - 3x^3 + 6x^2 - 12x + 8$?

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28. Determine the quotient.

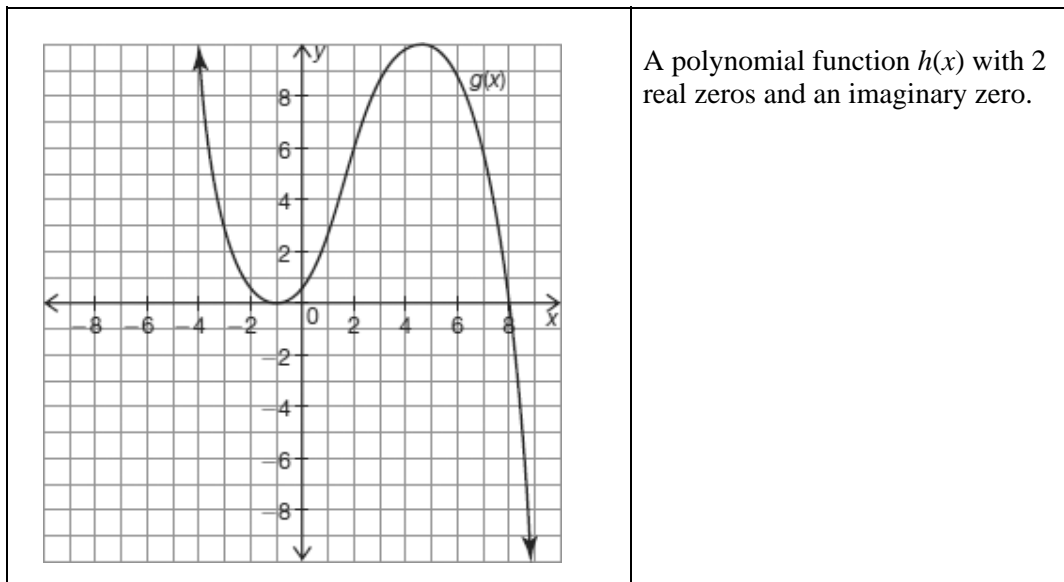
$$x - 4 \overline{) 2x^3 - 7x^2 - 19x + 60}$$

29. The polynomial $(x^3 + x^2 - 16x - 16)$ crosses the x-axis at 4. Rewrite the polynomial as the product of a linear factor and a quadratic factor.

30. Is $g(x) = (x + 8)(x - 1)(x + 2)$ the factored form of $f(x) = x^3 - 7x^2 - 10x + 16$?

31. Sketch the graph of $f(x) = x^4$ and describe the end behavior of the graph

32. Which function has an odd degree?



33. Convert from standard form to vertex form. $f(x) = 3x^2 - 12x + 10$

34. Convert from vertex form to standard form $f(x) = 3(x - 4)^2 + 7$