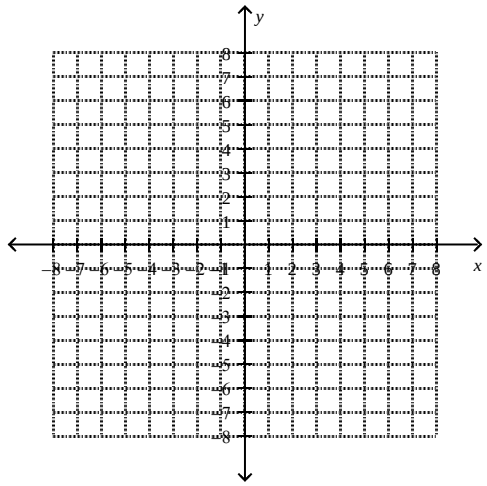
Algebra II Semester 1 Final Review

Graph the function and its parent function. Then describe the transformation.

1. $g(x) = -3(x-2)^2 - 2$



Write a function *g* whose graph represents the indicated transformation of the graph of *f*.

2. $f(x) = |x+4|$; horizontal shrink by a factor of $\frac{1}{5}$

3. $f(x) = x$; a vertical stretch by a factor of 3 followed by a translation 2 units down

4. Solve for z in the following system of equations:

$-x - 5y + z = 17$

$-5x - 5y + 5z = 5$

$2x + 5y - 3z = -10$

Describe the transformation of $f(x) = x^2$ represented by *g*. Then graph each function.

5. $g(x) = -\left(\frac{1}{2}x\right)^2$

6. *x*-intercepts of 6 and –1; passes through $(2,-2)$

Write a rule for *g* described by the transformations of the graph of *f*. Then identify the vertex.

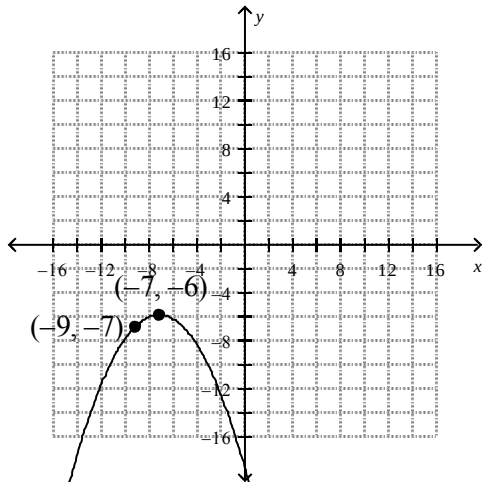
7. $f(x) = x^2$; vertical shrink by a factor of $\frac{1}{3}$ and a reflection in the *y*-axis, followed by a translation 4 units down.

Graph the functions for #8 & 9. Label the vertex and axis of symmetry.

8. $g(x) = 2(x+5)^2 + 4$

9. $h(x) = -2x^2 + 8x - 1$

Write an equation of the parabola in vertex form.

10. 

Solve the equation.

11. $-2x^2 = 12x + 18$

12. $3(x-2)^2 - 9 = 2$

13. $-y - 6 + y^2 = -8y + 2y^2$

14. $a^2 - 4 = 0$

15. $x^2 - 2x + 1 = -49$

16. $9x^2 + 6x + 1 = 75$

17. $4x^2 + 3x = -2$

Solve the system.

18. $-y = x + 2$

$x^2 + y = x + 33$

Solve the inequality. Round decimal answers to the nearest hundredth.

19. $x^2 + 9x + 14 < 0$

20. Graph $y \leq -2(x + 2)^2 - 3$.

Find the zero(s) of the function.

21. $g(x) = 3x^2 + 102$

Perform the operation. Write the answer in standard form.

22. $(9 + 13i) - (5 + 6i)$

23. $(7 + 7i)(6 - 5i)$

____ 24. Which statement is true about the quadratic function $y = x^2 - 6x - 16$?

A. To complete the square, add 3 to each side of the equation.
B. The vertex of the graph is $(-3, -25)$.
C. The vertex form is $y = (x - 25)^2 - 3$.
D. The vertex form is $y = (x - 3)^2 - 25$.

25. Find the discriminant of the quadratic equation $4x - 26 = -3x^2$ and describe the number and type of solutions of the equation.

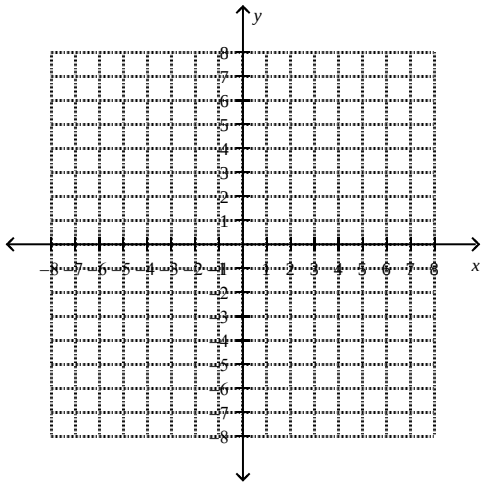
26. A boy throws a ball into the air. The equation $h = -16t^2 + 24t + 4$ models the path of the ball, where *h* is the height (in feet) of the ball *t* seconds after it is thrown. How long is the ball in the air? Round your answer to the nearest tenth of a second.

Describe the end behavior of the graph of the function.

27. $c(x) = 3x^5 - 12x^4 + 6x^3 + 3x - 6$

Graph the polynomial function.

28. $h(x) = x^3 - x^2 - 2$



Find the difference.

29. $(9x^5 + 7x^3 - x^2 + 3x) - (-7x^5 + x^4 - 8x^2 + 9)$

Find the product.

30. $(6x^2 - 6x + 8)(2x - 5)$

Use Pascal's Triangle to expand the binomial.

31. $(2d - 4)^4$

Divide using polynomial long division.

32. $(8x^4 - 3x^3 - 50) \div (x^2 - 2x + 1)$

Divide using synthetic division.

33. $(x^4 + 4x^3 - 11x + 12) \div (x - 1)$

Factor the polynomial completely.

34. $4r^6 - 60r^5 + 224r^4$

35. $m^7 + 125m^4$

36. $16h^3 - 144h^2 - 25h + 225$

37. $625a^4 - 81$

38. $(x - 3)^5$

Describe the transformation of *f* represented by *g*. Then graph each function.

39. $f(x) = x^3,\ g(x) = (2x)^3 + 3$

Find all real zeros of the function.

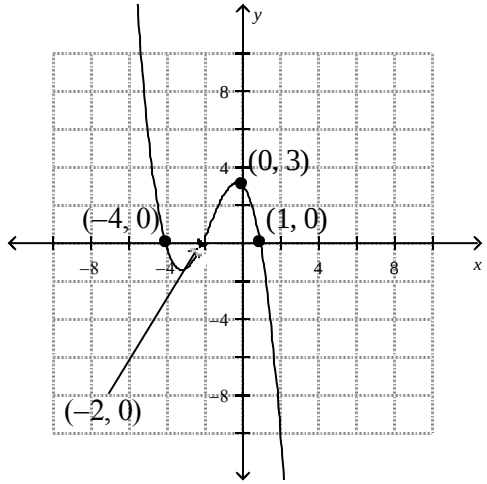
40. $f(x) = 4x^3 - 11x^2 - 6x + 9$

Write a polynomial function *f* of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.

41. $4, -5 + 2i$

Write a cubic function whose graph passes through the given points.

42.



Graph the function.

43. $g(x) = (x-5)^2(x-3)(x-1)$