

Core Algebra 2



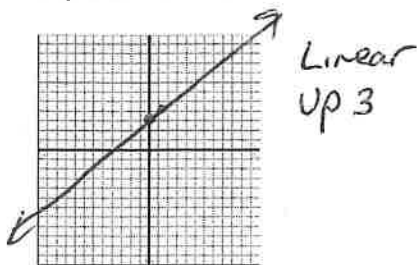
**KEEP
CALM
AND
GOOD LUCK
WITH MIDTERMS.**

Midterm Review

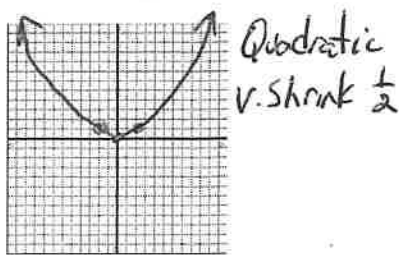
Chapter 1 Review

Graph the function and identify the function, then describe the transformations of functions.

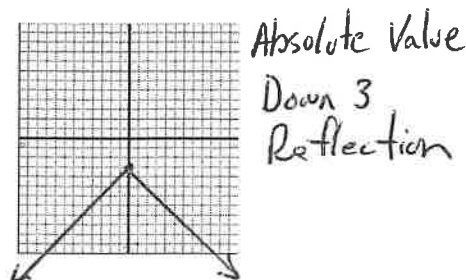
1. $f(x) = x + 3$



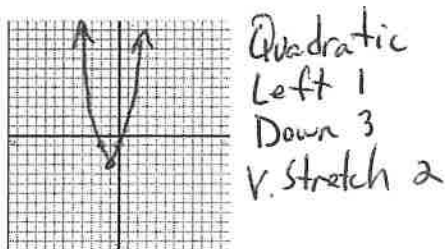
2. $h(x) = \frac{1}{2}x^2$



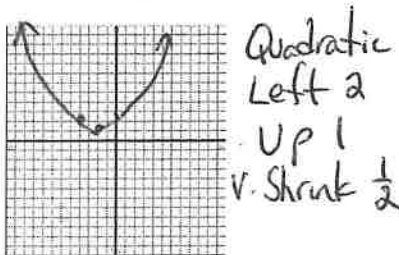
3. $f(x) = -|x| - 3$



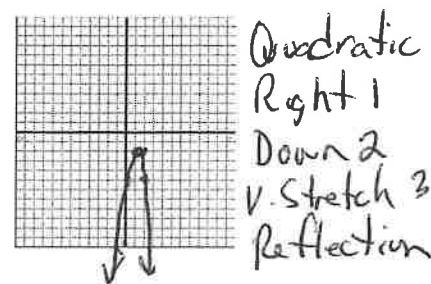
4. $f(x) = 2(x + 1)^2 - 3$



5. $h(x) = \frac{1}{2}(x + 2)^2 + 1$



6. $f(x) = -3(x - 1)^2 - 2$



7. Write a function g that is a translation 4 units right and 6 units down, followed by a reflection about the x -axis of the graph of $f(x) = -\frac{1}{2}(x + 1)^2$.

$$g(x) = -\frac{1}{2}(x - 3)^2 \quad g(x) = -\frac{1}{2}(x - 3)^2 - 6 \quad g(x) = \frac{1}{2}(x - 3)^2 + 6$$

8. Write a function g that is a translation 3 units left and 4 units up, followed by a reflection about the x -axis of the graph of $f(x) = (x + 3)^2$.

$$g(x) = (x + 6)^2 \quad g(x) = (x + 6)^2 + 4 \quad g(x) = -(x + 6)^2 - 4$$

9. Write a function g that is a translation 2 units right and 6 units up, followed by a v. stretch of 2 of the graph of $f(x) = -(x - 3)^2 - 2$.

$$g(x) = -(x - 5)^2 - 2 \quad g(x) = -(x - 5)^2 + 4 \quad g(x) = -2(x - 5)^2 + 8$$

10. Write a function g that is a translation 3 units left and 2 units down, followed by a v. shrink of $\frac{1}{2}$ of the graph of $f(x) = 2(x + 1)^2 + 4$.

$$g(x) = 2(x + 4)^2 + 4 \quad g(x) = 2(x + 4)^2 + 2 \quad g(x) = (x + 4)^2 + 1$$

11. Write a function g that is a translation 2 units left and 3 units down, v. stretch of 3, followed by a reflection about the x -axis of the graph of $f(x) = -2(x + 1)^2 - 1$.

$$g(x) = -2(x + 3)^2 - 1 \quad g(x) = -2(x + 3)^2 - 4 \quad g(x) = -6(x + 3)^2 - 12 \quad g(x) = 6(x + 3)^2 + 12$$

12. Write a function g that is a translation 4 units right and 5 units up, v. shrink of $\frac{1}{2}$, followed by a reflection about the x -axis of the graph of $f(x) = 4(x + 1)^2 - 3$.

$$g(x) = 4(x - 3)^2 - 3 \quad g(x) = 4(x - 3)^2 + 2 \quad g(x) = 2(x - 3)^2 + 1 \quad g(x) = -2(x - 3)^2 - 1$$

Write a function g whose graph represents the indicated transformations of the graph of f for #13-16.

13. $f(x) = x$; vertical stretch by a factor of 3.

$$g(x) = 3x$$

15. $f(x) = -3x + 4$; translation 3 units down followed by a reflection about the x -axis.

$$g(x) = -3x + 1$$

$$g(x) = 3x - 1$$

14. $f(x) = 2|x| - 9$; translation 2 units left and 6 units up followed by a vertical shrink by a factor of $\frac{1}{3}$.

$$g(x) = 2|x+2| - 9$$

$$g(x) = 2|x+2| - 3$$

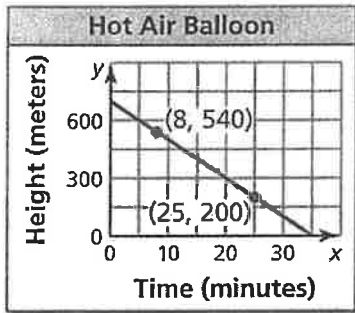
$$g(x) = \frac{2}{3}|x+2| - 1$$

16. $f(x) = \frac{1}{2}(x+2)^2 - 5$; vertical stretch by a factor of 2 followed by a translation of 4 units right.

$$g(x) = (x+2)^2 - 10$$

$$g(x) = (x-2)^2 - 10$$

17. Use the graph to write an equation of the line and interpret the slope.



$$(8, 540) (25, 200)$$

$$\frac{540-200}{8-25} = \frac{340}{-17} = -20$$

$$y - 200 = -20(x - 25)$$

$$y - 200 = -20x + 500$$

$$y = -20x + 700$$

Find the slope of the following points.

18. $(3, -5)(5, -9)$

$$\frac{-5 - -9}{3 - 5} = \frac{4}{-2} = -2$$

19. $(-6, 10)(-4, 7)$

$$\frac{10 - 7}{-6 - -4} = \frac{3}{-2} = -\frac{3}{2}$$

20. $(1, 8)(-3, 8)$

$$\frac{8 - 8}{1 - -3} = \frac{0}{4} = 0$$

21. $(-2, 7)(8, 11)$

$$\frac{7 - 11}{-2 - 8} = \frac{-4}{-10} = \frac{2}{5}$$

22. $(-4, 6)(4, -3)$

$$\frac{6 - -3}{-4 - 4} = \frac{9}{-8} = -\frac{9}{8}$$

23. $(-2, 3)(-8, 6)$

$$\frac{3 - 6}{-2 - -8} = \frac{-3}{6} = -\frac{1}{2}$$

Write the linear equation in slope-intercept form for each given set of information for #24-32.

24. $m = \frac{2}{3}, (3,6)$

$$y - 6 = \frac{2}{3}(x - 3)$$

$$y - 6 = \frac{2}{3}x - 2$$

$$y = \frac{2}{3}x + 4$$

25. $(-2,5), (-1,1)$ $\frac{5-1}{-2-(-1)} = \frac{4}{-1} = -4$

$$y - 1 = -4(x + 1)$$

$$y - 1 = -4x - 4$$

$$y = -4x - 3$$

26.

x	y
-4	2
-1	1
2	0
5	-1

$(-4,2), (-1,1)$

$$\frac{2-1}{-4-(-1)} = \frac{1}{-3}$$

$$y - 1 = -\frac{1}{3}(x + 1)$$

$$y - 1 = -\frac{1}{3}x - \frac{1}{3}$$

$$y = -\frac{1}{3}x + \frac{2}{3}$$

27. $m = 2, (-1,4)$

$$y - 4 = 2(x + 1)$$

$$y - 4 = 2x + 2$$

$$y = 2x + 6$$

28. $(5,9), (3,13)$

$$\frac{9-13}{5-3} = \frac{-4}{2} = -2$$

$$y - 9 = -2(x - 5)$$

$$y - 9 = -2x + 10$$

$$y = -2x + 19$$

29. $(-3,7), (-1,7)$

$$\frac{7-7}{-3-(-1)} = \frac{0}{-2} = 0 \text{ Hor. Line}$$

$$y = 7$$

30. The table shows the numbers of ice cream cones sold for different outside temperatures (in degrees Fahrenheit). Do the data show a linear relationship? If so, write an equation of a line of fit and use it to estimate how many ice cream cones are sold when the temperature is 60°F.

STAT EDIT L1 L2 STAT CALC 4

Temperature, x	53	62	70	82	90
Number of cones, y	90	105	117	131	147

$$y = 1.483x + 12.091$$

Solve the system of equations by graphing.

31. $3x + y = 3$
 $4x + 2y = 2$

$$(2, -3)$$

32. $2x + 2y = 6$
 $3x + y = 1$

$$(-1, 4)$$

33. $-x + 2y = -1$
 $2x - 3y = 3$

$$(3, 1)$$

Solve the system of equations by substitution.

34. $2x - 3y = -10$

$$3x + y = 7$$

$$2x - 3y = -10$$

$$y = -3x + 7$$

$$2x - 3(-3x + 7) = -10$$

$$2x + 9x - 21 = -10$$

$$11x = 11$$

$$x = 1$$

$$y = -3(1) + 7 = 4$$

$$(1, 4)$$

35. $3x - 2y = 5$

$$x + 3y = 9$$

$$3x - 2y = 5$$

$$x = -3y + 9$$

$$3(-3y + 9) - 2y = 5$$

$$-9y + 27 - 2y = 5$$

$$-11y = -22$$

$$y = 2$$

$$x = -3(2) + 9 = 3$$

$$(3, 2)$$

36. $2x - y = -8$

$$4x + 3y = 4$$

$$2x - y = -8$$

$$4x + 3(2x + 8) = 4$$

$$4x + 6x + 24 = 4$$

$$10x = -20$$

$$x = -2$$

$$y = 2(-2) + 8 = 4$$

$$(-2, 4)$$

Solve the system of equations by elimination.

37. $2x + y = 6$
 $-3x - 2y = -8$

$$6x + 3y = 18$$

$$-6x - 4y = -16$$

$$-y = 2$$

$$y = 2$$

$$2x + 2 = 6$$

$$2x = 4$$

$$x = 2$$

$$(2, 2)$$

38. $3x - 2y = 4$
 $4x + 3y = 11$

$$-12x + 8y = -16$$

$$12x + 9y = 33$$

$$17y = 17$$

$$y = 1$$

$$3x - 2(1) = 4$$

$$3x = 6$$

$$x = 2$$

$$(2, 1)$$

39. $x + 3y = 6$
 $3x + 2y = 4$

$$x + 3(2) = 6$$

$$x + 6 = 6$$

$$x = 0$$

$$-3x + 9y = -18$$

$$-7y = -14$$

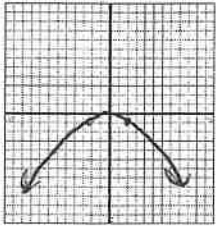
$$y = 2$$

$$(0, 2)$$

Chapter 2 Review

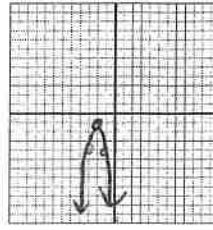
Describe the transformation of $f(x) = x^2$ represented by g . Then graph each function.

40. $g(x) = -\frac{1}{2}x^2$



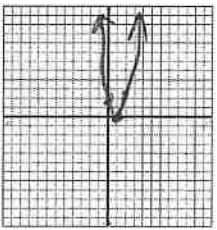
V. Shrink $\frac{1}{2}$
Reflection

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



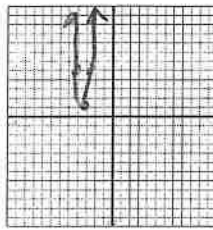
Left 2
Down 1
V. Stretch 3
Reflection

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



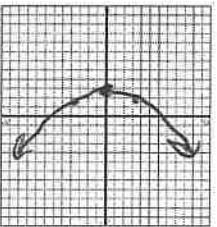
Right 1
V. Stretch 2

43. $g(x) = 4(x+3)^2 + 1$



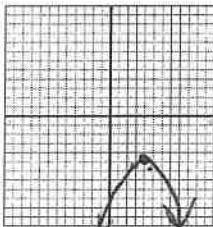
Left 3
Up 1
V. Stretch 4

44. $g(x) = -\frac{1}{4}x^2 + 3$



Up 3
V. Shrink $\frac{1}{4}$
Reflection

45. $g(x) = -(x-4)^2 - 5$



Right 4
Down 5
Reflection

Write a rule for $g(x)$.

46. The graph of g is a vertical stretch by a factor of 3, followed by a translation 5 units right of the graph $f(x) = x^2$.

$$g(x) = 3x^2 \quad g(x) = 3(x-5)^2$$

47. The graph of g is a translation 2 units left and 3 units up, followed by a reflection about the x -axis of the graph $f(x) = x^2 - 2$.

$$g(x) = (x+2)^2 - 2 \quad g(x) = (x+2)^2 + 1 \quad g(x) = -(x+2)^2 - 1$$

48. The graph of g is a translation 3 units right, 2 down, and a vertical stretch by a factor of 3 of the graph $f(x) = x^2$.

$$g(x) = (x-3)^2 \quad g(x) = (x-3)^2 - 2 \quad g(x) = 3(x-3)^2 - 6$$

49. The graph of g is a translation 5 units left and 4 units up, followed by a reflection about the x -axis of the graph $f(x) = (x+1)^2$

$$g(x) = (x+6)^2 \quad g(x) = (x+6)^2 + 4 \quad g(x) = -(x+6)^2 - 4$$

50. The graph of g is a translation 4 units left and 3 units down, followed by a reflection about the x -axis of the graph

$$f(x) = (x - 2)^2 + 4$$

$$g(x) = (x + 2)^2 + 4 \quad g(x) = (x + 2)^2 + 1 \quad g(x) = -(x + 2)^2 - 1$$

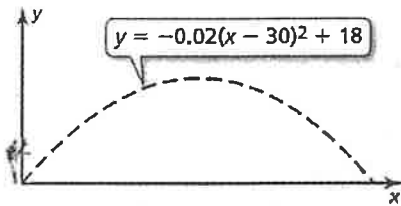
51. The graph of g is a translation 3 units right and 2 units down, vertical shrink by a factor of $\frac{1}{2}$, followed by a reflection about the x -axis of the graph $f(x) = (x - 2)^2 + 4$

$$g(x) = (x - 5)^2 + 4 \quad g(x) = (x - 5)^2 + 2 \quad g(x) = \frac{1}{2}(x + 5)^2 + 1 \quad g(x) = -\frac{1}{2}(x + 5)^2$$

52. The graph of g is a translation 4 units left and 5 units down, vertical stretch by a factor of 3, followed by a reflection about the x -axis of the graph $f(x) = (x - 1)^2 + 2$

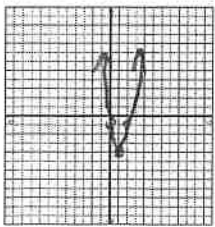
$$g(x) = (x + 3)^2 + 2 \quad g(x) = (x + 3)^2 - 5 \quad g(x) = 3(x + 3)^2 - 15 \quad g(x) = -3(x + 3)^2 + 15$$

53. The graph represents the path of a football kicked by a player, where x is the horizontal distance (in yards) and y is the height (in yards). The player kicks the ball a second time so that it travels the same horizontal distance, but reaches a maximum height that is 6 yards greater than the maximum height of the first kick. Write a function that models the path of the second kick.



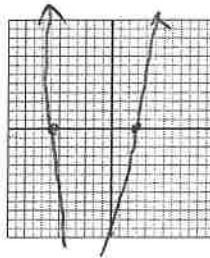
Graph the function. Label the vertex and axis of symmetry. Find the minimum value or maximum value of the function.

54. $f(x) = 3(x - 1)^2 - 4$



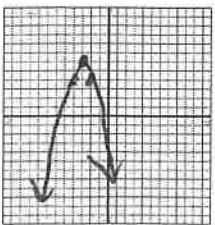
V: (1, -4)
AS: $x = 1$
Min = -4

55. $h(x) = (x - 3)(x + 7)$



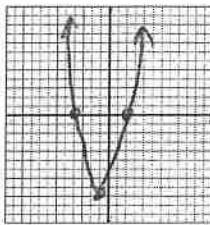
(3, 0) (-7, 0) $3 + 7 = -4 \div 2 = -2$
AS: $x = -2$
(-2, -25)
Min = -25

56. $f(x) = -2(x + 3)^2 + 6$



V: (-3, 6)
AS: $x = -3$
Max = 6

57. $h(x) = (x + 4)(x - 2)$



(-4, 0) (2, 0) $-4 + 2 = -2 \div 2 = -1$
AS: $x = -1$
(-1, -9)
Min = -9

Write the equation of the parabola with the given characteristics.

58. Write a quadratic function in standard form with a vertex of (3,2) and y-intercept of 20. $(0,20)$

$$y = a(x-p)(x-q) \quad a = \frac{10}{3} \quad y = \frac{10}{3}(x-3)(x-2)$$

$$20 = a(0-3)(0-2)$$

$$20 = 6a$$

59. passes through (-2,3), and has a vertex of (-4,7).

$$y = a(x-h)^2 + k \quad -4 = 4a \quad y = -1(x+4)^2 + 7$$

$$3 = a(-2+4)^2 + 7 \quad a = -1$$

$$3 = 4a + 7$$

60. Passes through (4,3) and has x-intercepts -1 and 5.

$$y = a(x-p)(x-q) \quad a = -\frac{3}{5} \quad y = -\frac{3}{5}(x+1)(x-5)$$

$$3 = a(4+1)(4-5)$$

$$3 = -5a$$

61. passes through (4,11), and has a vertex of (2,3).

$$11 = a(4-2)^2 + 3 \quad a = 2 \quad y = 2(x-2)^2 + 3$$

$$11 = 4a + 3$$

$$8 = 4a$$

62. Passes through (1,4) and has x-intercepts -2 and 6.

$$4 = a(1+2)(1-6) \quad a = -\frac{4}{15} \quad y = -\frac{4}{15}(x+2)(x-6)$$

$$4 = -15a$$

63. passes through (2,-5), and has a vertex of (-2,-1).

$$-5 = a(2+2)^2 - 1 \quad a = -\frac{1}{4} \quad y = -\frac{1}{4}(x+2)^2 - 1$$

$$-5 = 16a - 1$$

$$-4 = 16a$$

64. Passes through (3,4) and has x-intercepts 0 and 8.

$$4 = a(3-0)(3-8) \quad a = -\frac{4}{15} \quad y = -\frac{4}{15}(x)(x-8)$$

$$4 = -15a$$

65. passes through (5,1), and has a vertex of (3,-1).

$$1 = a(5-3)^2 - 1 \quad a = \frac{1}{2} \quad y = \frac{1}{2}(x-3)^2 - 1$$

$$1 = 4a - 1$$

$$2 = 4a$$

66. Passes through (-1,-6) and has x-intercepts -5 and 3.

$$-6 = a(-1+5)(-1-3) \quad a = \frac{3}{8} \quad y = \frac{3}{8}(x+5)(x-3)$$

$$-6 = -16a$$

Factor (these will not be on the Exam but need to review and practice).

67. $x^2 - 7x + 12$

$$(x-3)(x-4)$$

68. $x^2 - 36$

$$(x+6)(x-6)$$

69. $x^2 + 10x - 24$

$$(x+12)(x-2)$$

70. $3x^2 - 6x + 9$

$$3(x^2 - 2x + 3)$$

71. $2x^2 + 9x - 5$

$$\frac{2x}{10} \quad \frac{2x}{-1} \quad \begin{array}{c} 10 \\ \wedge \\ 10-1 \end{array}$$

$$(x+5)(2x-1)$$

72. $x^2 - 10x + 25$

$$(x-5)(x-5)$$

$$(x-5)^2$$