HW 2.1.1: Transformations

Describe how each function is a transformation of the original function $f(x)$

1. $f(x-73)$
2. $f(x+39)$
3. $f(x+7)$
4. $f(x-13)$
5. $f(x)+10$
6. $f(x)+4$
7. $f(x)-3$
8. $f(x)-20$
9. $f(x-1)+4$
10. $f(x+17)-8$

11. Write a formula for $f(x)=\sqrt{x}$ shifted up 4 units and left 3 units.

12. Write a formula for $f(x)=|x|$ shifted down 7 units and right 2 unit.

13. Write a formula for $f(x)=\dfrac{1}{x}$ shifted down 9 units and right 1 unit.

14. Write a formula for $f(x)=\dfrac{1}{x^2}$ shifted up 6 units and left 10 units.

15. Tables of values for $f(x)$, $g(x)$, and $h(x)$ are given below. Write $g(x)$ and $h(x)$ as transformations of $f(x)$.

x	0	1	2	3	4
f(x)	0	1	-1	3	4

x	1	2	3	4	5
g(x)	0	1	-1	3	4

x	0	1	2	3	4
h(x)	1	2	0	4	5

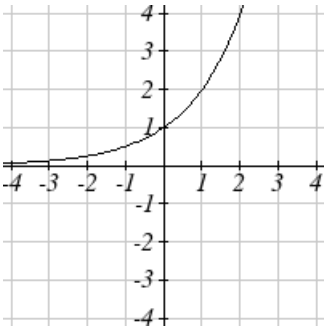
16. Tables of values for $f(x)$, $g(x)$, and $h(x)$ are given below. Write $g(x)$ and $h(x)$ as transformations of $f(x)$.

x	0	1	2	3	4
f(x)	1	-1	6	4	3

x	-1	0	1	2	3
g(x)	1	-1	6	4	3

x	0	1	2	3	4
h(x)	0	-2	5	3	2

The graph of $f(x)=2^x$ is shown. Sketch a graph of each transformation of $f(x)$



17. $g(x)=2^x-1$
18. $h(x)=2^x+3$
19. $w(x)=2^{x+1}$
20. $q(x)=2^{x-3}$
21. $h(x)=2^{-x}$
22. $g(x)=-2^x+1$

Sketch a graph of each function as a transformation of a toolkit function.

23. $f(t)=(t+4)^2-5$

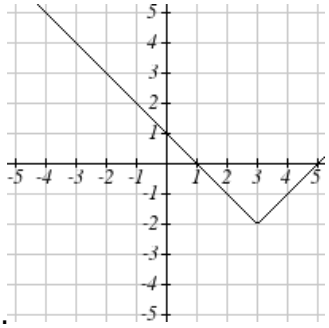
24. $h(x)=|x-2|+7$

25. $k(x)=(x-1)^3-6$

26. $m(t)=9+\sqrt{t+8}$

Write an equation for each function graphed below.

27.



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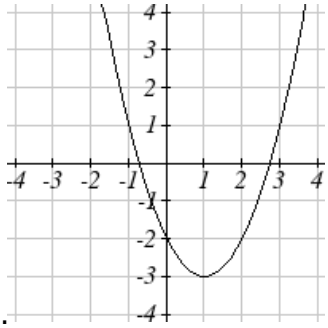

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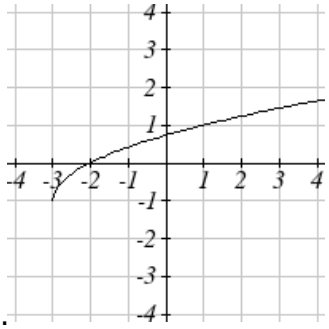

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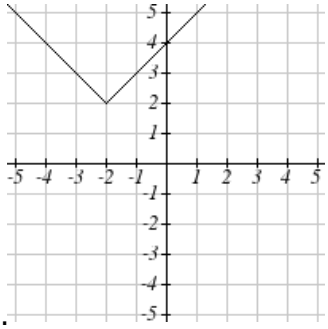


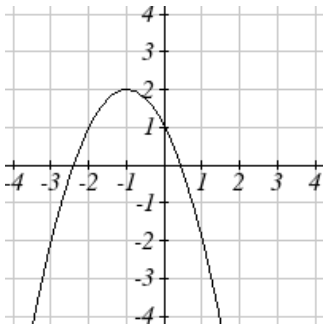
31. Starting with the graph of $f(x)=3^x$ write the equation of the graph that results from
    a. reflecting $f(x)$ about the x-axis and the y-axis

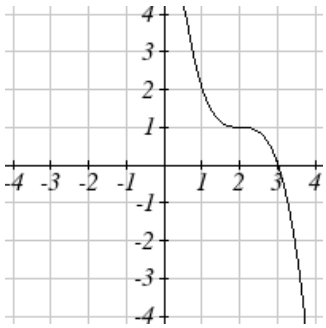
    b. reflecting $f(x)$ about the x-axis, shifting left 6 units, and down 11 units

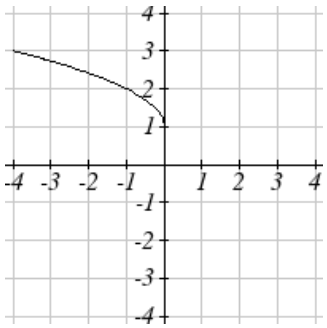
32. Starting with the graph of $f(x)=5^x$ write the equation of the graph that results from
    a. reflecting $f(x)$ about the x-axis

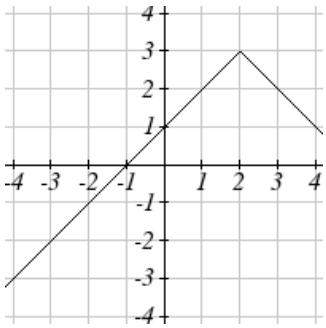
    b. reflecting $f(x)$ about the y-axis, shifting right 2 units, and up 9 units

Write an equation for each function graphed below.

33. 

34. 

35. 

36. 

Describe how each function is a transformation of the original function $f(x)$.

37. $f(-x)$
38. $-f(x)$
39. $7f(x)$
40. $2f(x)$
41. $f(10x)$
42. $f(-2x)$
43. $f\left(\frac{1}{6}x\right)$
44. $f\left(\frac{1}{13}x\right)$
45. $8f\left(-x\right)$
46. $-f(8x)$

Write a formula for the function that results when the given toolkit function is transformed as described.

51. $f(x)=|x|$ reflected over the y axis and horizontally compressed by a factor of 3.

52. $f(x)=\sqrt{x}$ reflected over the x axis and horizontally stretched by a factor of 5.

53. $f(x)=\frac{1}{x^2}$ vertically compressed by a factor of 2, then shifted to the left 8 units and down 6 units.

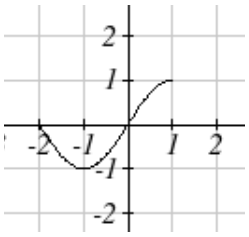
54. $f(x)=\frac{1}{x}$ vertically stretched by a factor of 4, then shifted to the right 1 unit and up 10 units.

55. $f(x)=x^2$ horizontally compressed by a factor of 7, then shifted to the right 8 units and up 5 units.

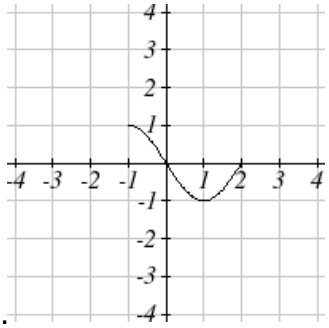
56. $f(x)=x^2$ horizontally stretched by a factor of 7, then shifted to the left 2 units and down 12 units.

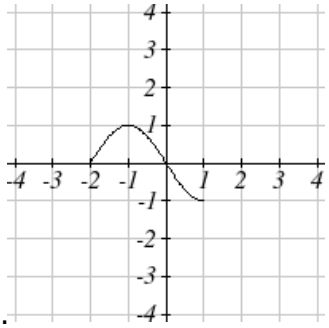
Describe how each formula is a transformation of a toolkit function. Then sketch a graph of the transformation.

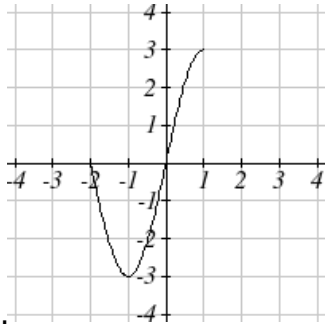
57. $f\left(x\right)=5\left(x+16\right)^2-24$
58. $g(x)=7\left(x+11\right)^2-15$
59. $h\left(x\right)=-15|x-20|-19$
60. $k\left(x\right)=8\sqrt{x}-12$
61. $m\left(x\right)=\frac{1}{5}x^3$
62. $n\left(x\right)=-\frac{1}{2}|x-10|$
63. $p\left(x\right)=\left(\frac{1}{7}x\right)^2-14$
64. $q\left(x\right)=\left(\frac{1}{3}x\right)^3+12$
65. $a\left(x\right)=\sqrt{-x+6}$
66. $b\left(x\right)=\sqrt[3]{-x-21}$

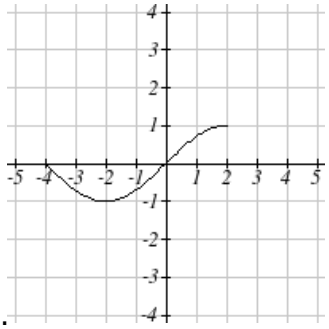


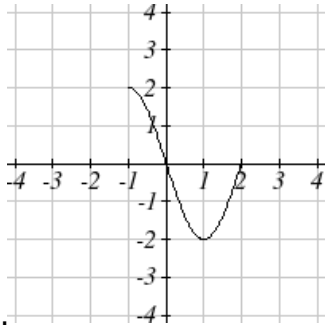
The function $f(x)$ is graphed here. Write an equation for each graph below as a transformation of $f(x)$.

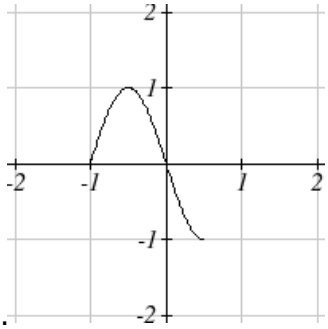
67. 

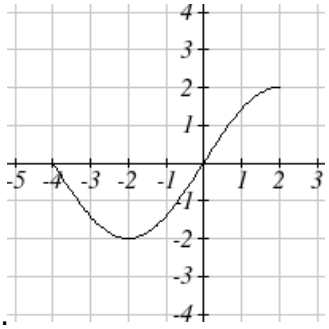
68. 

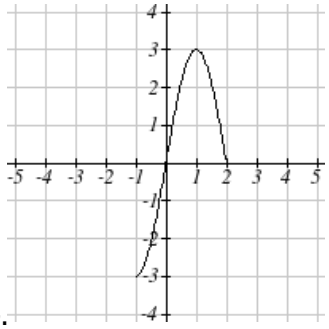
69. 

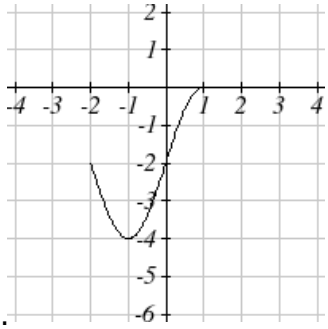
70. 

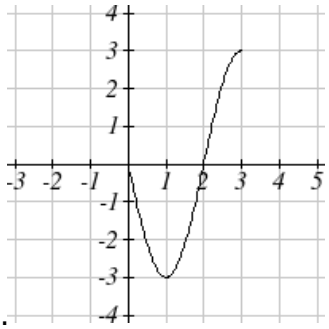
71. 

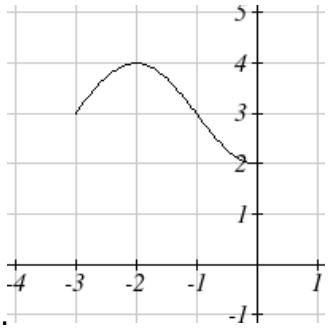
72. 

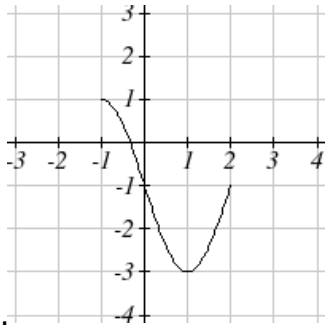
73. 

74. 

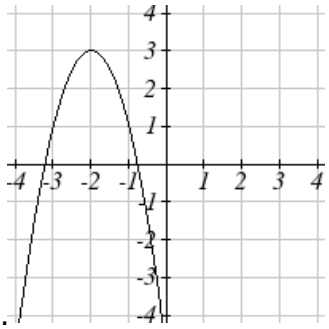
75. 

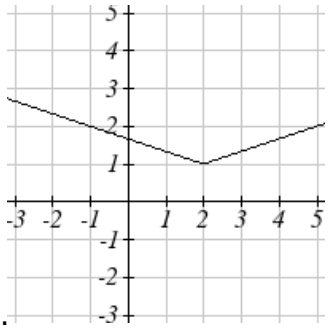
76. 

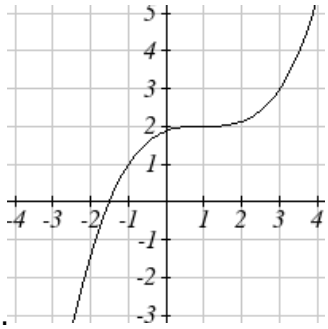
77. 

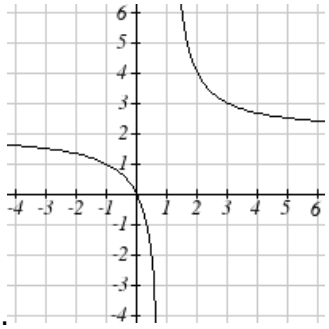
78. 

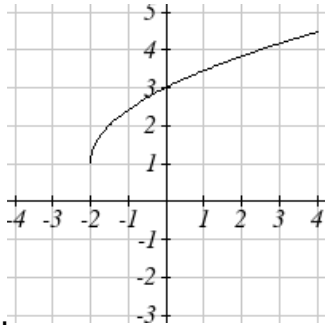
Write an equation for each transformed toolkit function graphed below.

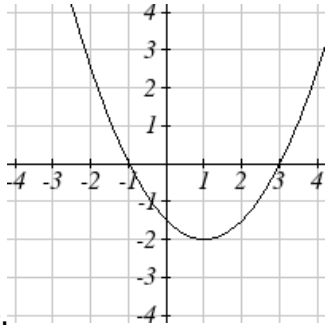
79. 

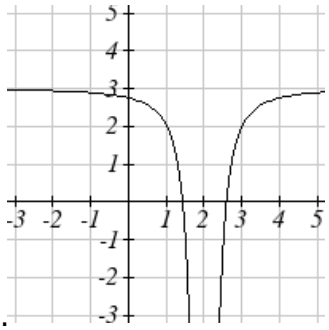
80. 

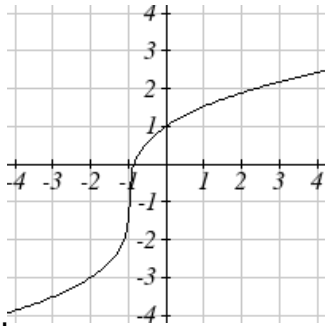
81. 

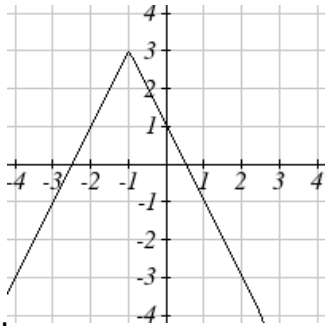
82. 

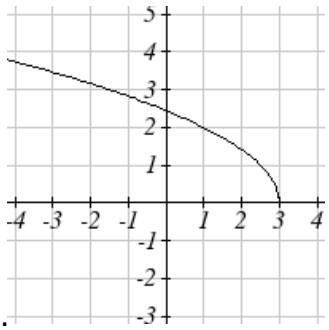
83. 

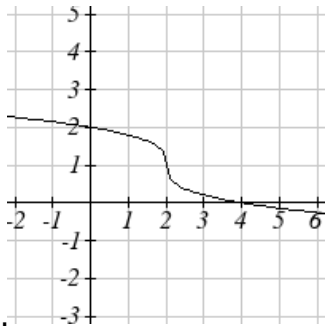
84. 

85. 

86. 

87. 

88. 

89. 

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