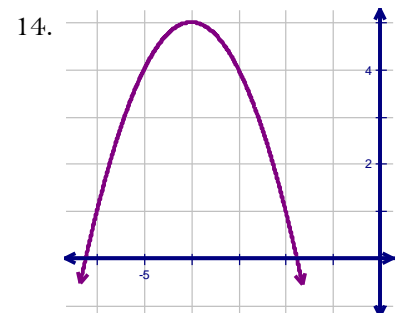
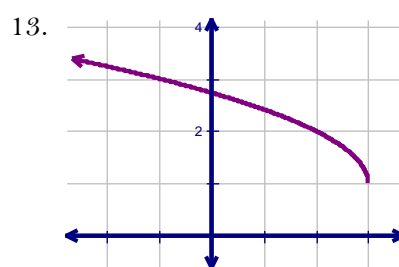
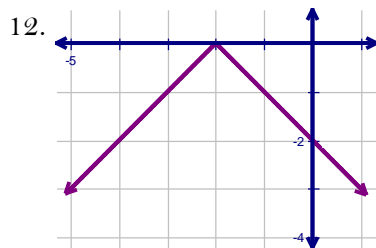
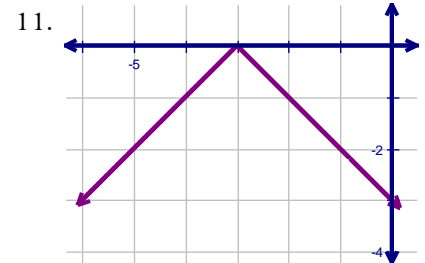
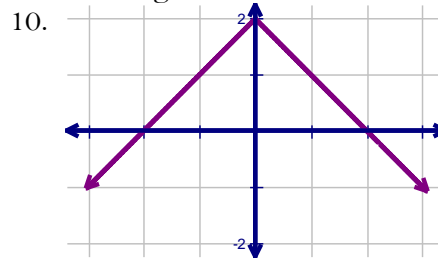
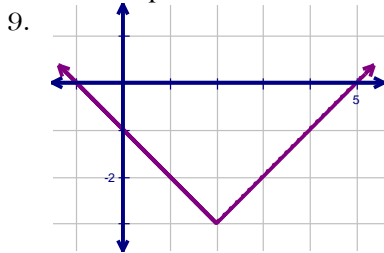


Using the parent function $f(x) = |x|$, find the equation of the new function with the given transformations.

1. up 3
2. reflected over the x -axis
3. reflected over the x -axis, left 11
4. left 2, down 7
5. reflected over the x -axis, right 1, up 5
6. vertically dilated by a factor of 3, left 6
7. horizontally dilated by a factor of 4, reflected over the x -axis
8. horizontally dilated by a factor of $\frac{1}{5}$, down 2

Find the equation as well as the domain and range of each function.



Draw a complete graph of each function.

15. $a(x) = -1 + |x - 3|$

16. $b(x) = 3 - |x + 2|$

17. $c(x) = 1 + \sqrt{x + 3}$

18. $d(x) = -\sqrt{-(x - 1)}$

19. $e(x) = 1 + (x - 2)^2$

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