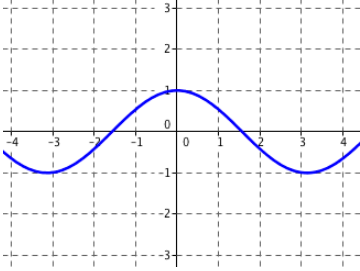
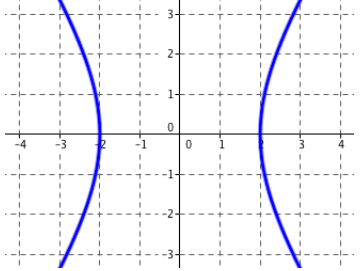
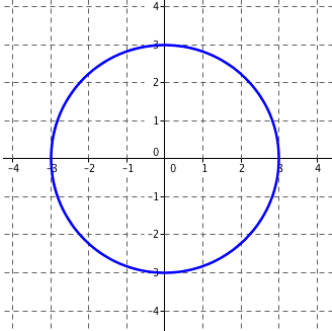
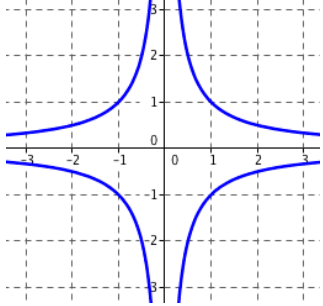


Symmetry, Even/Odd Homework

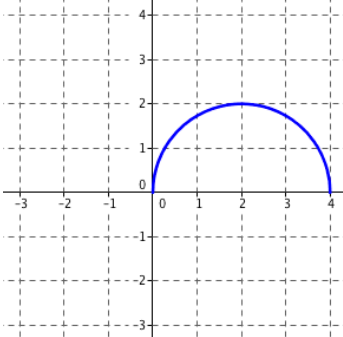
I. Plot each point. Then plot the point that is symmetric to it with respect to (a) the x-axis, (b) the y-axis, (c) the origin, and (d) the line $y=x$.

1. $(3, 4)$	2. $(-2, 1)$
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II. Determine whether each graph is symmetric with the y-axis, x-axis, origin, and/or the line $y=x$.

3. 	4. 
5. 	6. 

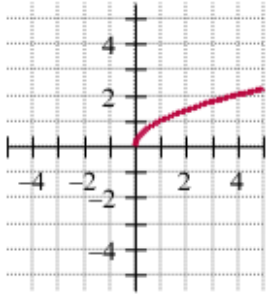
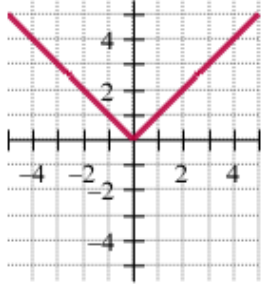
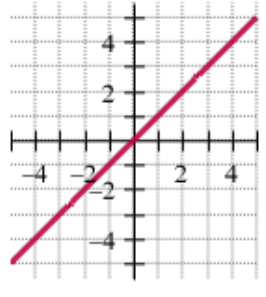
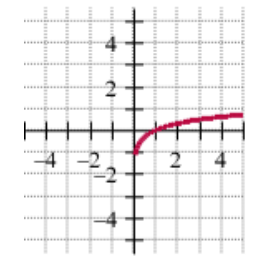
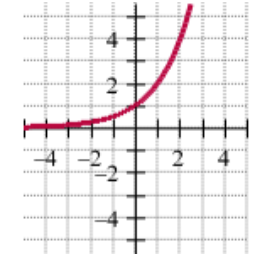
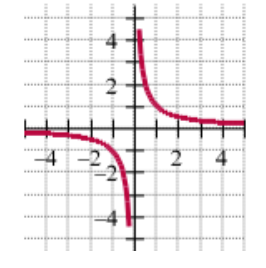
III. The graph below is a portion of a complete graph. Sketch a complete graph for each of the following symmetries: with respect to a) the x-axis, b) the y-axis, c) the origin, and d) the line $y=x$.

7. 
--

IV. Test each equation algebraically for: (a) x-axis symmetry, (b) y-axis symmetry, (c) origin symmetry, and (d) symmetry about the line $y=x$.

8. $y^2 - x - 4 = 0$	9. $9x^2 - 4y^2 = 36$	10. $ y = x - 2$
11. $y = \frac{x^3 - 5x}{x}$	12. $y = \frac{x}{x^2 + 9}$	13. $y = \frac{x+1}{x-1}$

V. Determine whether each function is even, odd, or neither. Explain your reasoning.

<p>14.</p> 	<p>15.</p> 	<p>16.</p> 	
<p>17.</p> 	<p>18.</p> 	<p>19.</p> 	
<p>20. $f(x) = 4x + 5$</p>	<p>21. $f(x) = x^3 + x$</p>	<p>22. $f(x) = \frac{x^3 - x}{x^5}$</p>	<p>23. $f(x) = (x - 4)^2$</p>
<p>24. $f(x) = x\sqrt{x^2 + 1}$</p>	<p>25. $f(x) = x^2\sqrt{x + 1}$</p>	<p>26. $f(x) = \frac{x^2 + 5}{x^4 - 3x^2 + 1}$</p>	<p>27. $f(x) = \frac{-x^3}{x^5 + 1}$</p>

VI. Suppose f contains the point $(7, -2)$.

28. If f is an even function what other point must f contain?

29. If f is an odd function what other point must f contain?

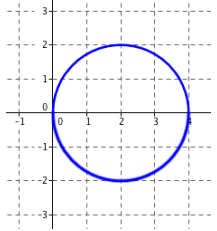
ANSWERS

1.
 a) (3, -4)
 b) (-3, 4)
 c) (-3, -4)
 d) (4, 3)

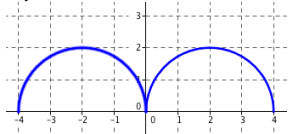
2.
 a) (-2, -1)
 b) (2, 1)
 c) (2, -1)
 d) (1, -2)

3. y-axis
 4. y-axis, x-axis, origin
 5. y-axis, x-axis, origin, $y=x$
 6. y-axis, x-axis, origin, $y=x$

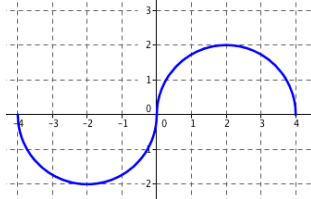
7.
 a)



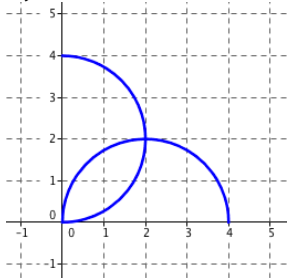
b)



c)



d)



8. x-axis
 9. x-axis, y-axis, origin
 10. x-axis
 11. y-axis
 12. origin
 13. $y=x$

14. Neither. The graph does not have symmetry about the y-axis or the origin.
 15. Even. The graph has symmetry about the y-axis.
 16. Odd. The graph has symmetry about the origin.
 17. Neither. The graph does not have symmetry about the y-axis or the origin.
 18. Neither. The graph does not have symmetry about the y-axis or the origin.
 19. Odd. The graph has symmetry about the origin.
 20. Neither. $f(-x) \neq f(x)$ or $-f(x)$.
 21. Odd, $f(-x) = -f(x)$
 22. Even, $f(-x) = f(x)$
 23. Neither. $f(-x) \neq f(x)$ or $-f(x)$
 24. Odd, $f(-x) = -f(x)$
 25. Neither. $f(-x) \neq f(x)$ or $-f(x)$
 26. Even, $f(-x) = f(x)$
 27. Neither. $f(-x) \neq f(x)$ or $-f(x)$
 28. (-7, -2)
 29. (-7, 2)