Trig 3.1

Use algebraic tests to determine symmetry
Classify functions as even or odd

symmetry

point symmetry (origin)

line symmetry (x-axis, y-axis, y=x y=-x)

even function

odd function

activity: whiteboards (if time)

33
35
37
39

33)

yes x $(a,-b)$

no y $(-a,b)$

$y^2+3x=0 \longrightarrow$ (a,b)

$\sqrt{y^2}=\sqrt{-3x}$

$y=\pm\sqrt{-3x}$

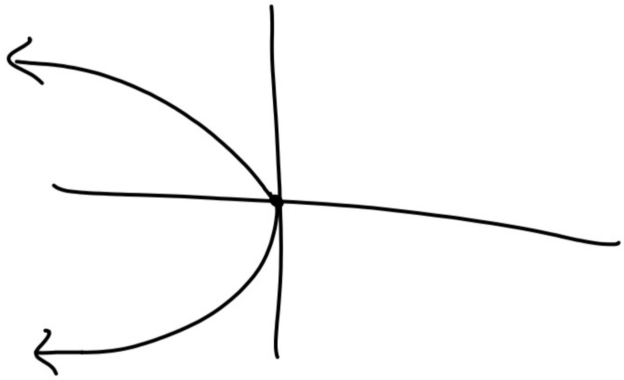
$b^2+3a=0$

$-b\cdot -b+3a=0$

$b^2+3a=0$

$b\cdot b+3\cdot -a=0$

$b^2-3a=0$



35. $x = \pm\sqrt{12-8y^2}$ $a = \pm\sqrt{12-8b^2}$

yes x-axis $(a,-b)$ $a = \pm\sqrt{12-8b^2}$

yes y-axis $(-a,b)$

$-a = \pm\sqrt{12-8y2}$

$x^2 = 12-8y^2$

$x^2-12 = -8y^2$

$+\sqrt{\left(\frac{(x^2-12)}{-8}\right)} = \pm y$

$-$

0	1.2
0	-1.2
5	—
-5	—

37.

$|y| = x^3 - x$

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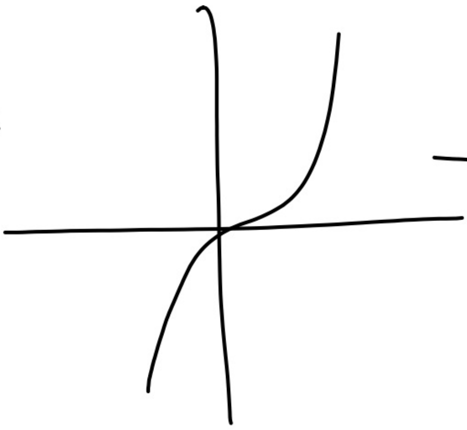
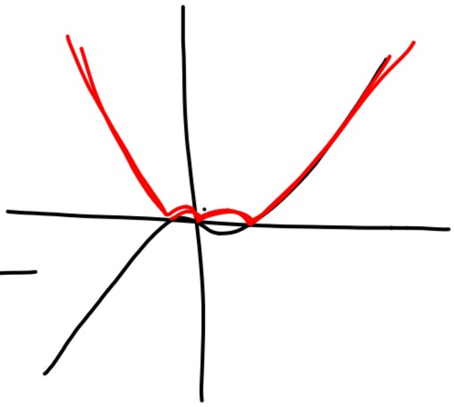
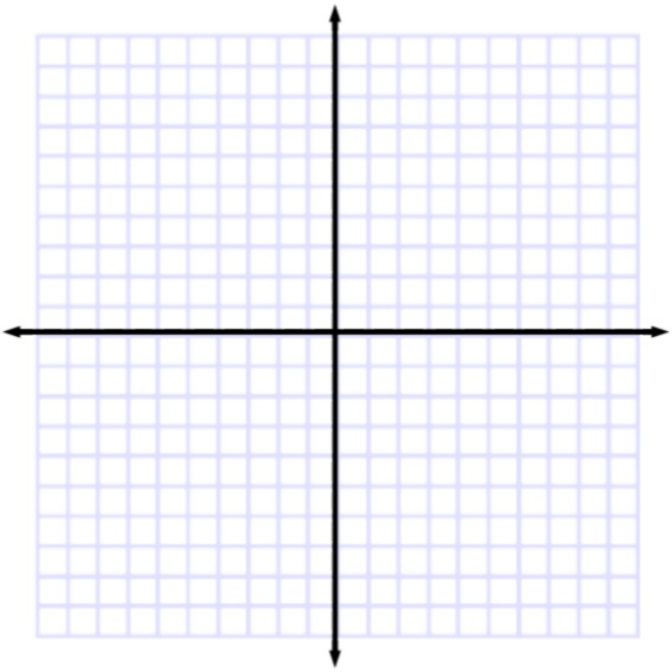




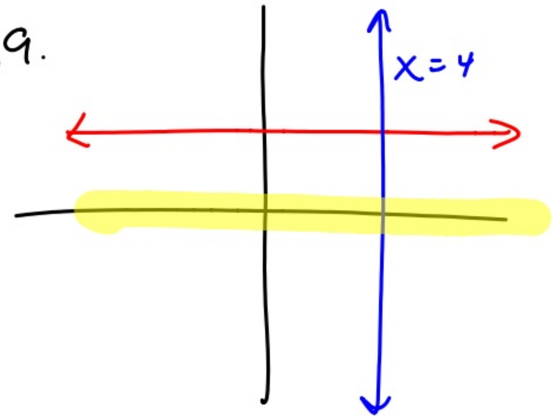
Compare (a,b) and (-a,-b)

Symmetry with Respect to the Origin	The graph of a relation S is symmetric with respect to the origin if and only if $(a, b) \in S$ implies that $(-a, -b) \in S$. A function has a graph that is symmetric with respect to the origin if and only if $f(-x) = -f(x)$ for all x in the domain of f.

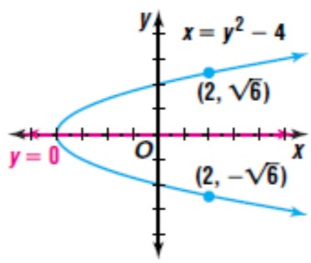
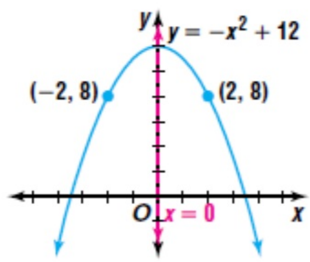
Also "odd function"



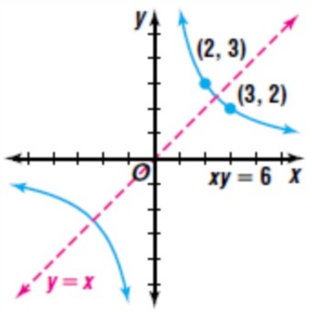
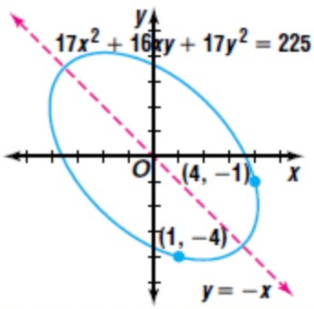
39.



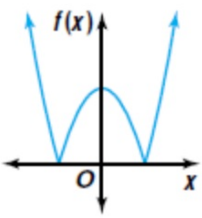
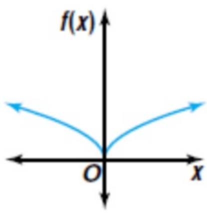
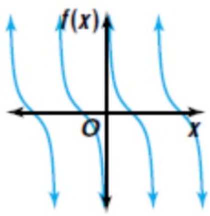
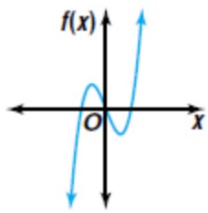
Substitute & compare to the parent graph. Are they the same?
(a,b) compare with...

Symmetry with Respect to the:	Definition and Test	Example
x-axis		
y-axis		

also "even"

Symmetry with Respect to the Line:	Definition and Test	Example
$y = x$		
$y = -x$	equations.	

y=axis
origin

even functions		odd functions	
$f(-x) = f(x)$		$f(-x) = -f(x)$	
			
symmetric with respect to the *y*-axis		symmetric with respect to the origin	

(same as odd)

Determine whether the graph of each function is symmetric with respect to the origin.

6. $f(x) = x^6 + 9x$

7. $f(x) = \frac{1}{5x} - x^{19}$

Determine whether the graph of each equation is symmetric with respect to the x-axis, y-axis, the line $y = x$, the line $y = -x$, or none of these.

8. $6x^2 = y - 1$

9. $x^3 + y^3 = 4$

Whiteboards:
Symmetric x-axis
Symmetric y-axis
Symmetric y=x
Symmetric y=-x
Even/odd/neither