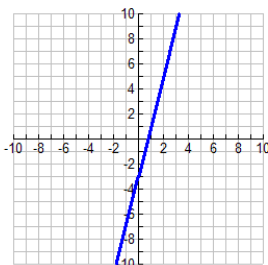


## Algebra 2 Odd Functions

SHOW ALL WORK on the worksheet

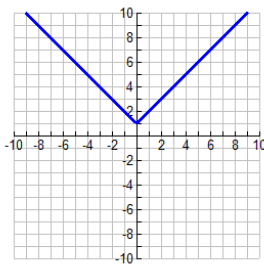
Determine whether the following functions are even, odd, or neither.

1.  $f(x) = 4x - 3$



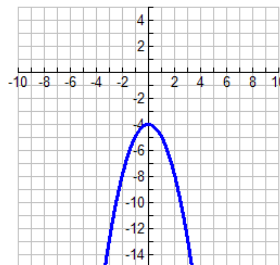
Neither

2.  $f(x) = |x| + 1$



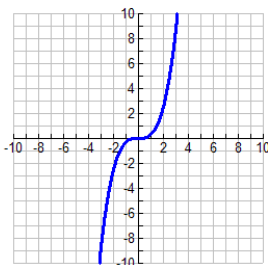
Even

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



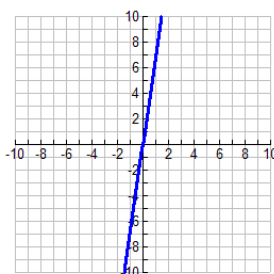
Even

4.  $f(x) = \frac{1}{3}x^3$



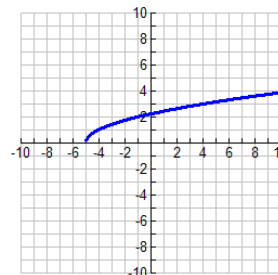
Odd

5.  $f(x) = 7x$



Odd

6.  $f(x) = \sqrt{x+5}$



Neither

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

$$\begin{aligned} f(-x) &= 3(-x)^2 + 1 \\ &= 3x^2 + 1 \\ &= f(x) \end{aligned}$$

Even

8.  $f(x) = x^3 - 2x$

$$\begin{aligned} f(-x) &= (-x)^3 - 2(-x) \\ &= -x^3 + 2x \\ &= -(x^3 - 2x) \\ &= -f(x) \end{aligned}$$

Odd

9.  $f(x) = 3x + 4$

$$\begin{aligned} f(-x) &= 3(-x) + 4 \\ &= -3x + 4 \\ &\neq f(x) \text{ or } -f(x) \end{aligned}$$

Neither

10.  $f(x) = x^2 - 5x$

$$\begin{aligned} f(-x) &= (-x)^2 - 5(-x) \\ &= x^2 + 5x \\ &\neq f(x) \text{ or } -f(x) \end{aligned}$$

Neither

11.  $f(x) = \frac{1}{x}$

$$\begin{aligned} f(-x) &= \frac{1}{-x} \\ &= -\frac{1}{x} \\ &= -f(x) \end{aligned}$$

Odd

12.  $f(x) = \frac{x}{x^2+1}$

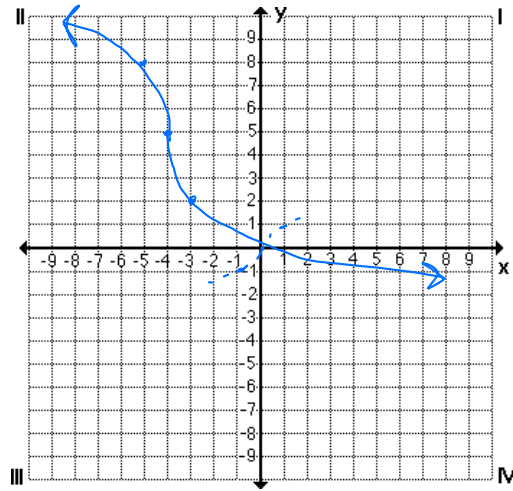
$$\begin{aligned} f(-x) &= \frac{-x}{(-x)^2+1} \\ &= \frac{-x}{x^2+1} \\ &= -\frac{x}{x^2+1} \\ &= -f(x) \end{aligned}$$

odd

## Algebra 2 Odd Functions

Graph each function and state the key characteristics

13.  $f(x) = -3\sqrt[3]{x+4} + 5$



Domain:  $(-\infty, \infty)$  or  $\mathbb{R}$

Range:  $(-\infty, \infty)$  or  $\mathbb{R}$

x-int: 0.63

y-int: 0.2378

End Behavior: as  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$   
as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$

Increase: None

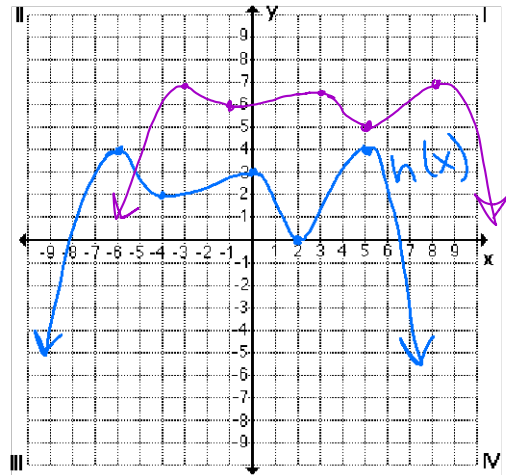
Decrease:  $(-\infty, \infty)$

Max: None

Min: None

Line of Symmetry: None

14.  $y = \frac{1}{2}h(x-3) + 5$



Domain:  $(-\infty, \infty)$  or  $\mathbb{R}$

Range:  $(-\infty, 7]$

x-int:  $\approx -6.1, 11$

y-int:  $\approx 6.1$

End Behavior: as  $x \rightarrow \infty$ ,  $y \rightarrow -\infty$   
as  $x \rightarrow -\infty$ ,  $y \rightarrow -\infty$

Increase:  $(-\infty, -3) \cup (-1, 3) \cup (5, 8)$

Decrease:  $(-3, -1) \cup (3, 5) \cup (8, \infty)$

Max: at  $(-3, 7)$ ,  $(3, 6.5)$ ,  $(8, 7)$

Min: at  $(-1, 6)$ ,  $(5, 5)$

Line of Symmetry: None