

MA1 Notes on even and odd functions

“Now if you are going to win any battle you have to do one thing. You have to make the mind run the body. Never let the body tell the mind what to do. The body will always give up. It is always tired morning, noon, and night. But the body is never tired if the mind is not tired. When you were younger the mind could make you dance all night, and the body was never tired... You've always got to make the mind take over and keep going.”

Definition of Even and Odd Functions

The function f is an **even function** if

$$f(-x) = f(x) \text{ for all } x \text{ in the domain of } f.$$

The right side of the equation of an even function does not change if x is replaced with $-x$.

The function f is an **odd function** if

$$f(-x) = -f(x) \text{ for all } x \text{ in the domain of } f.$$

Every term in the right side of the equation of an odd function changes its sign if x is replaced with $-x$.

Even Functions and y-Axis Symmetry

The graph of an even function in which $f(-x) = f(x)$ is symmetric with respect to the y -axis.

Odd Functions and Origin Symmetry

The graph of an odd function in which $f(-x) = -f(x)$ is symmetric with respect to the origin.

Determine if the given functions are even, odd, or neither.

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

2. $F(x) = x^3$

3. $F(x) = x^2 - x$

4. $F(x) = x^4 + 2x^2$

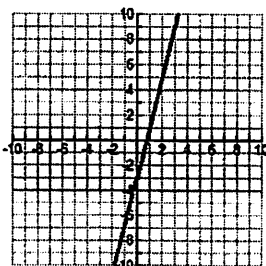
5. $f(x) = x^3 + 3x^2$

6. $F(x) = x^5 - 4x^3$

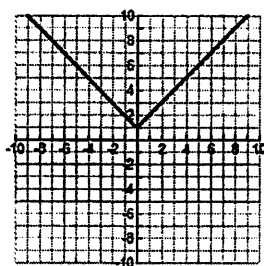
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Determine whether the following functions are even, odd, or neither.

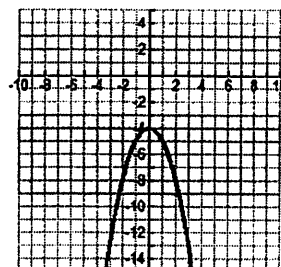
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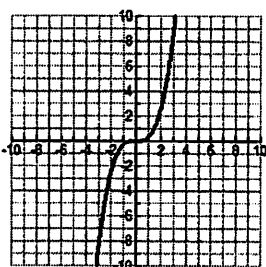
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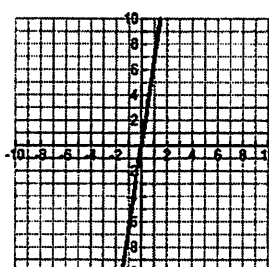
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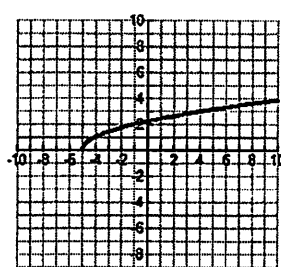
4.



5.



6.



7.

