

Assignment

Write

Choose the term from the box that best completes each statement.

even function	end behavior	symmetric about a point
power function	symmetric about a line	odd function

1. A function is _____ if the line divides the graph into two identical parts.
2. The _____ of a graph of a function is the behavior of the graph as x approaches infinity and as x approaches negative infinity.
3. A(n) _____ has a graph symmetric about the origin, thus $f(x) = -f(-x)$.
4. A function is _____ if each point on the graph has a point the same distance from the central point but in the opposite direction.
5. A(n) _____ has a graph symmetric about the y -axis, thus $f(x) = f(-x)$.
6. A(n) _____ is a function of the form $P(x) = ax^n$, where n is a non-negative integer.

Remember

A power function is a function of the form $P(x) = ax^n$, where n is a non-negative integer.

An even function has a graph symmetric about the y -axis, thus $f(x) = f(-x)$, and an odd function has a graph symmetric about the origin, thus $f(x) = -f(-x)$.

Practice

1. Graph each function. Determine whether the function is even, odd, or neither. Then describe the end behavior of the graph.
 - a. $f(x) = x^3 + x$.
 - b. $f(x) = x^3 + x^2 - 6x$.
2. Sketch each function and describe the end behavior of each graph.
 - a. $f(x) = x^{20}$
 - b. $f(x) = x^{25}$
3. Determine algebraically whether each function is even, odd, or neither.
 - a. $f(x) = x^3 - 4x + 3$
 - b. $f(x) = 2x^4 - x^2 + 9$

Stretch

1. Consider the function $f(x) = 3x^6 - 5x^4 + 2x^2 - 100$. Determine whether the function is even, odd, or neither. Then describe the end behavior of the graph.
2. Rewrite the function $f(x) = x^3$ for each transformation.
 - a. The graph is shifted down 3 units.
 - b. The graph is shifted to the left 5 units.
 - c. The graph is vertically stretched by a factor of 2.
 - d. The graph is reflected across the x -axis.

Review

1. Consider the functions $k(x) = x + 1$, $m(x) = x - 4$, $n(x) = x + 5$, and $f(x) = k(x) \cdot m(x) \cdot n(x)$.
 - a. Determine the degree of the function $f(x)$. Explain your reasoning.
 - b. Determine the zeros of $f(x)$. Explain your reasoning.
 - c. Determine the intervals over which the value of $f(x)$ is positive. Determine the intervals over which the value of $f(x)$ is negative. Explain your reasoning.
2. Nina has a piece of wire 18 feet long that she wants to bend into a rectangle that she will then run yarn across to form artwork.
 - a. Define the function $A(w)$ to represent the area of the wire artwork as a function of the length. Explain your reasoning.
 - b. Determine the maximum area of the wire artwork as well as the length and width that will result in the maximum area. Explain your reasoning.
3. Add or subtract each expression.
 - a. $(5 + 3i) + (8 - 9i)$
 - b. $(-10 - 7i) - (4 - 15i)$