

Assignment

Write

Define each term in your own words.

1. absolute maximum
2. absolute minimum
3. extrema

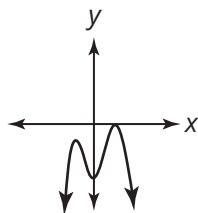
Remember

- The maximum number of extrema in a polynomial function $f(x) = x^n$ is $n - 1$.
- The maximum number of x -intercepts is the same as the degree of the function.
- The combination of real and imaginary roots of a polynomial function are equal to the degree of the polynomial and can be used to determine the shape of its graph.

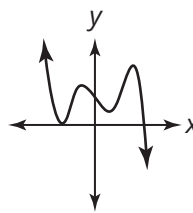
Practice

1. Describe the combination of real and imaginary roots for each graphed function. Include the multiplicity of each real root.

a. Quartic



b. Quintic



2. Sketch a graph of a polynomial function with the characteristics given. If the graph is not possible to sketch, explain why.

a. Characteristics:

- degree 4
- absolute minimum at $x = -2$
- 2 real roots
- as $x \rightarrow \infty, f(x) \rightarrow \infty$
- as $x \rightarrow -\infty, f(x) \rightarrow \infty$

b. Characteristics:

- negative a value
- even degree
- absolute minimum at $x = 4$
- as $x \rightarrow \infty, f(x) \rightarrow \infty$
- as $x \rightarrow -\infty, f(x) \rightarrow \infty$

Stretch

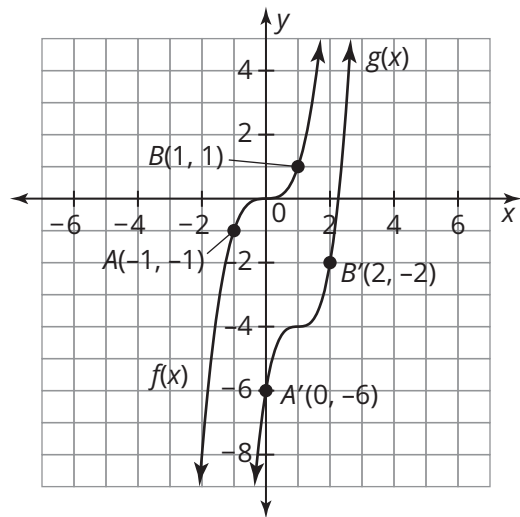
Sketch a graph of a polynomial function with the characteristics given. If the graph is not possible to sketch, explain why.

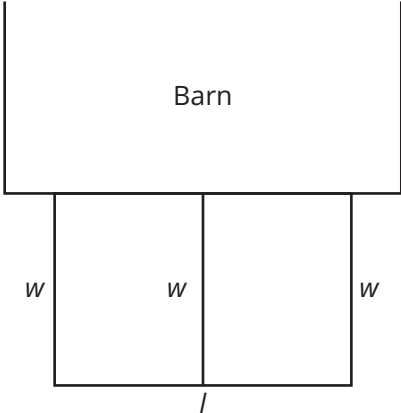
Characteristics:

- degree 6
- two real roots
- relative maximum at $y = 1$
- absolute minimum at $x = -4$

Review

- Analyze the graphs of the functions $f(x)$ and $g(x)$.
 - Write the equation for $f(x)$.
 - The function $g(x)$ is a transformation of the function $f(x)$. Describe the transformations performed on $f(x)$ that result in the function $g(x)$. Explain your reasoning.
 - Write the equation for $g(x)$.
 - Is the function $g(x)$ even, odd, or neither? Explain your reasoning.



- A farmer is going to fence in an area next to the barn into a rectangle split into two equal pens. The farmer has 165 yards of fencing available.
 

- Define the function $A(w)$ to represent the fenced in area as a function of the width. Explain your reasoning.
 - Determine the maximum area of the entire fenced in area as well as the width and length that will result in the maximum area. Explain your reasoning.
- Solve the equation $b(b + 3) = -12$.