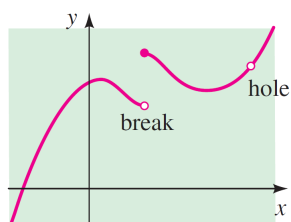
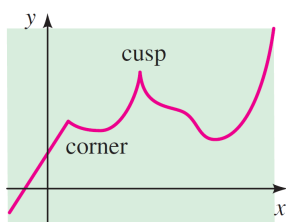


# Properties of Polynomial Graphs

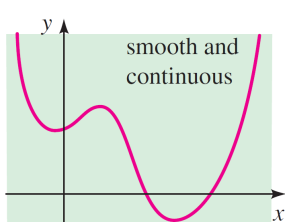
The graph of a polynomial function is always a smooth curve; that is, it has no breaks or corners.



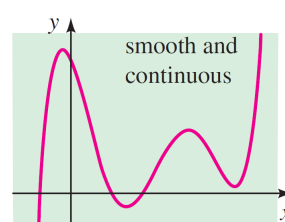
Not the graph of a polynomial function



Not the graph of a polynomial function



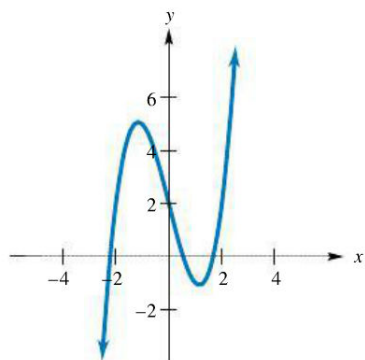
Graph of a polynomial function



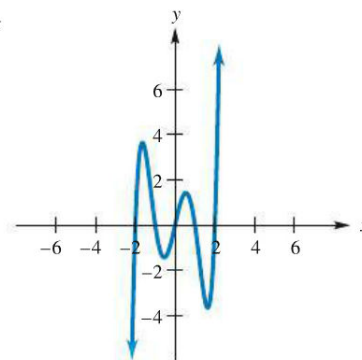
Graph of a polynomial function

1. The total number of peaks and valleys on the graph of a polynomial function of degree  $n$  is at most  $n - 1$ .
2. The number of  $x$ -intercepts on the graph of a polynomial function of degree  $n$  is at most  $n$ .

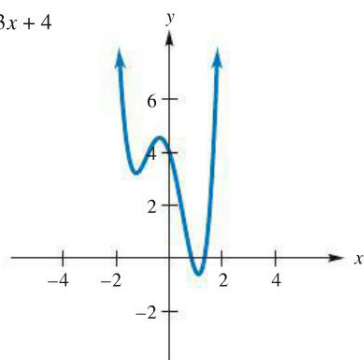
- (a)  $f(x) = x^3 - 4x + 2$   
 1 peak } total 2  
 1 valley }  
 3  $x$ -intercepts



- (b)  $f(x) = x^5 - 5x^3 + 4x$   
 2 peaks } total 4  
 2 valleys }  
 5  $x$ -intercepts



- (c)  $f(x) = 1.5x^4 + x^3 - 4x^2 - 3x + 4$   
 1 peak } total 3  
 2 valleys }  
 2  $x$ -intercepts



- (d)  $f(x) = -x^6 + x^5 + 2x^4 + 1$   
 2 peaks } total 3  
 1 (shallow) valley }  
 2  $x$ -intercepts

