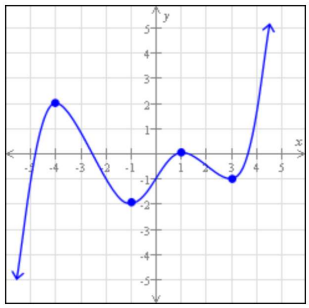
Definition of a Polynomial

What polynomials can have…	What polynomials can't have…

Local Extrema



Local Minimum
Values at which the function has a local minimum:

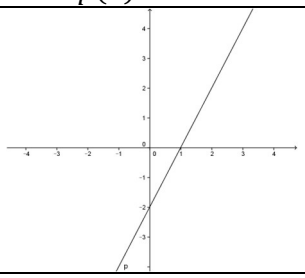
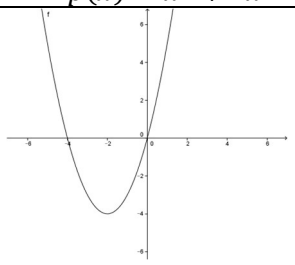
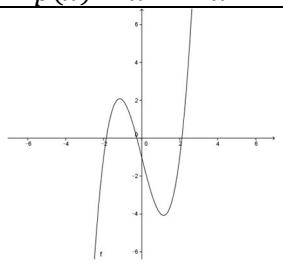
Local Minimum values:

Local Maximum
Values at which the function has a local maximum:

Local Maximum values:

Degree

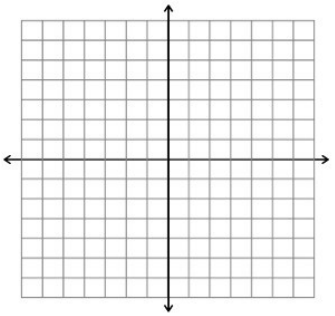
Use the equation of the polynomial to determine its degree. Then use the graph to count the number of changes in direction (turning points) and x-intercepts.

Polynomial Function	$p(x) = 2x - 2$	$p(x) = x^2 + 4x$	$p(x) = x^3 - 4x - 1$
Graph			
Degree			
# of Turning Points			
# of x-intercepts			

Critical Points

b. What connection do you see between the degree of a polynomial and its number of turning points? (Critical)

c. What connection do you see between the degree of a polynomial and its number of x-intercepts?

Think about the function: $p(x) = x^4 + 3$	Now graph it:	How many turning points does it actually have?
How many turning points do you think it should have?		How many x-intercepts does it actually have?
How many x-intercepts do you think it should have?		How could you revise your answers in parts 1b and 1c?

What you have observed is that if the degree is n:

- The number of x-intercepts is <u>at most</u> n
- The number of turning points is <u>at most</u> $n - 1$

Or stated differently:

- The <u>minimum</u> degree is the number of x-intercepts OR number of turning points +