Trig 3.6

Find the extrema of a function

critical point (value, numbers) *something interesting*

x-coord.

maximum (absolute, relative)

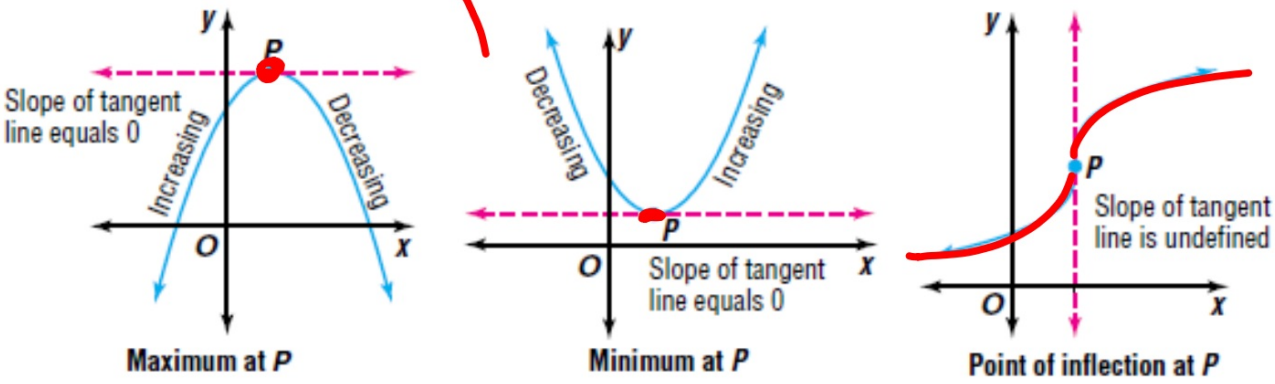
minimum (absolute, relative)

inflection point curve changes slope

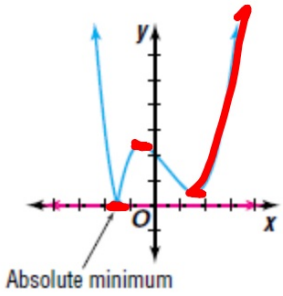
→ extrema (extremum): all max, min,
inflection points (only if they ask)

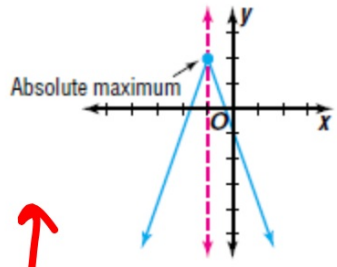
activity: graphing calculators/ trace/ table

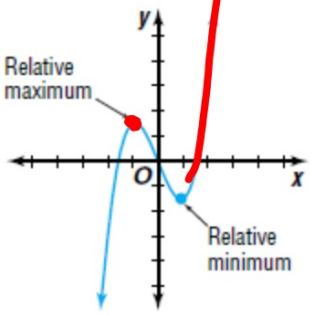
spaghetti follows curve



Where does slope change? x-word


y
O
x
Absolute minimum


Absolute maximum
y
O
x


Relative
maximum
y
O
x
Relative
minimum

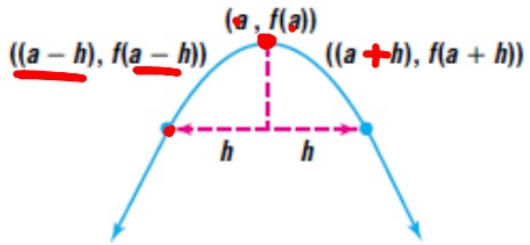
Don't overthink this...
Mountaintops
Valleys
Other

p. 174

Critical Points

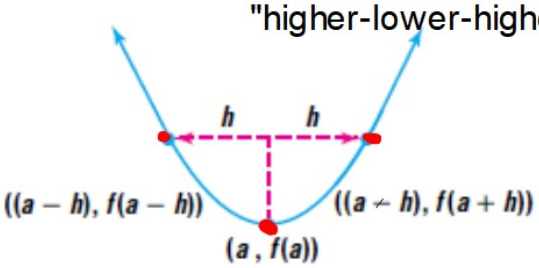
For $f(x)$ with $(a, f(a))$ as a critical point and h as a small value greater than zero

"lower-higher-lower"



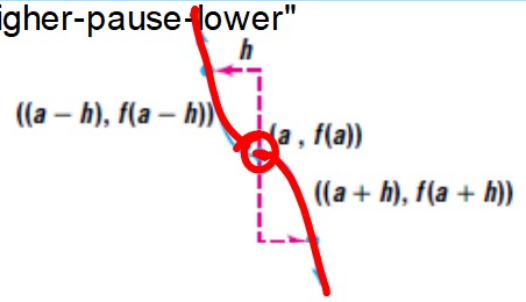
$f(a)$
$f(a)$
$f(a)$ is a maximum.

"higher-lower-higher"



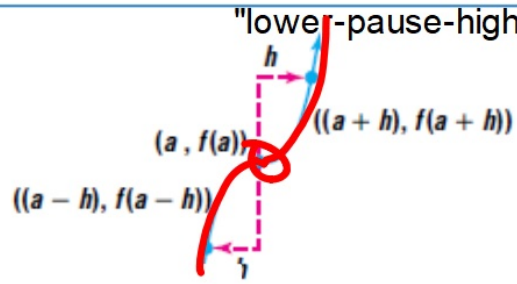
$- h) > f(a)$
$+ h) > f(a)$
$f(a)$ is a minimum.

"higher-pause-lower"



$f(a - h) > f(a)$
$f(a + h) < f(a)$
$f(a)$ is a point of inflection.

"lower-pause-higher"



$f(a - h) < f(a)$
$f(a + h) > f(a)$
$f(a)$ is a point of inflection.

Critical point: something interesting is happening here
at x= *whatever.*
What is it?
Estimate (graph) by eyeball
Prove it! (table) look at y-coords.

→ x=1 rel. max
x=0 IF
x=3 rel min

3 The function $f(x) = 2x^5 - 5x^4 - 10x^3$ has critical points at $x = -1$, $x = 0$, and $x = 3$. Determine whether each of these critical points is the location of a maximum, a minimum, or a point of inflection.

$n-1$