Ch 34 Gradients of curves (C)

Given a function $y = f(x)$ we denote its gradient function by $\frac{dy}{dx}$ or simply by y'.

Gradient function of $y = x^n$

If $y = x^n$ then $y' = nx^{n-1}$.

Rules for finding gradient functions

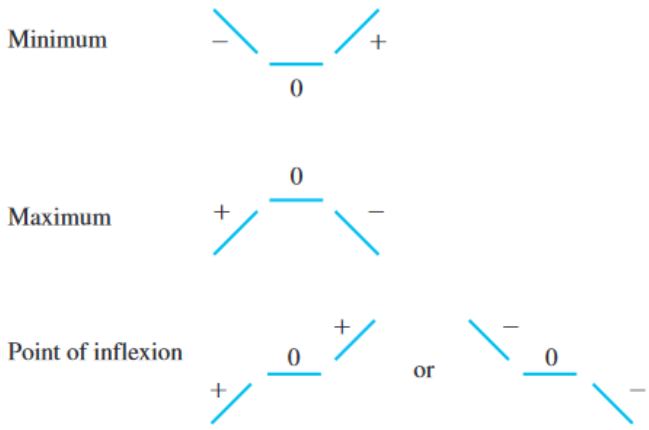
Rule 1: If $y = f(x) + g(x)$ then $y' = f'(x) + g'(x)$.
Rule 2: If $y = f(x) - g(x)$ then $y' = f'(x) - g'(x)$.
Rule 3: If $y = kf(x)$, where k is a number, then $y' = kf'(x)$.

Higher derivatives

y'' or $\frac{d^2y}{dx^2}$ is found by differentiating y'.

Finding max & min points of a curve

$y = f(x)$	$y' = f'(x)$	Notes
constant	0	
x	1	
x^2	$2x$	
x^n	nx^{n-1}	
e^x	e^x	
e^{kx}	ke^{kx}	k is a constant
$\sin x$	$\cos x$	
$\cos x$	$-\sin x$	
$\sin kx$	$k \cos kx$	k is a constant
$\cos kx$	$-k \sin kx$	k is a constant
$\ln kx$	$1/x$	k is a constant



Stationary points are located by setting the gradient function equal to zero, that is $y' = 0$.

If y'' is positive at the stationary point, the point is a minimum.
If y'' is negative at the stationary point, the point is a maximum.
If y'' is equal to zero, this test does not tell us anything and the previous method should be used.