Chain Rule:

example: $y = \sin(2x+3)$

$$\begin{array}{ll} s:\ \sin(\qquad) & \cos(2x+3) \\ c:\ 2x+3 & 2 \end{array}$$

$y' = 2\cos(2x+3)$

example: $y = (x^2+2x)^4$

$$\begin{array}{ll} s:\ (\qquad)^4 & 4(x^2+2x)^3 \\ c:\ x^2+2x & (2x+2) \end{array}$$

$y' = 4(2x+2)(x^2+2x)^3$

example: $y = \sqrt{3x^2-4} = (3x^2-4)^{\frac{1}{2}}$

$$\begin{array}{ll} s:\ (\qquad)^{1/2} & \frac{1}{2}(3x^2-4)^{-1/2} \\ c:\ 3x^2-4 & 6x \end{array}$$

$y' = 3x(3x^2-4)^{-1/2} = \dfrac{3x}{\sqrt{3x^2-4}}$

example: $y = 2(x^2 - 3x + 4)^4$

s:	$2(\quad)^4$	$8(x^2-3x+4)^3$
c:	$x^2 - 3x + 4$	$(2x-3)$

$$y' = 8(2x-3)(x^2-3x+4)^3$$

Formula:

$$h = f(g(x))$$

s:	$f(\quad)$	$f'(\quad)$
c:	$g(x)$	$g'(x)$

$$h' = f'(g(x)) \cdot g'(x)$$

Peanuts:

example: $y = \sin^3(2x+3)$

$y = [\sin(2x+3)]^3$

S:	$[\quad]^3$	$3[\sin(2x+3)]^2$
C:	$\sin(2x+3)$	$\cos(2x+3)$
P:	$2x+3$	2

$$y' = 6\cos(2x+3)\sin^2(2x+3)$$

example: $y = 3\tan\sqrt{x+1}$

$y = 3\tan(x+1)^{1/2}$

S:	$3\tan(\quad)$	$3\sec^2((x+1)^{1/2})$
C:	$(x+1)^{1/2}$	$\frac{1}{2}(x+1)^{-1/2}$
P:	$x+1$	1

$$y' = \frac{3}{2}(x+1)^{-1/2}\sec^2(x+1)^{1/2}$$

$$= \frac{3\sec^2(\sqrt{x+1})}{2\sqrt{x+1}}$$

$$y = -5\cos^4(2x+3)$$

$$= -5\left[\cos(2x+3)\right]^4$$

S:	$-5[\quad]^4$	$\cancel{-20}\,[\cos(2x+3)]^3$
C:	$\cos(2x+3)$	$\cancel{-}\sin(2x+3)$
P:	$2x+3$	$\cancel{2}$

$$y' = \underline{\underline{40}}\,\sin(2x+3)\cos^3(2x+3)$$