



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

re-write
(notation)

$$u = \sin((\cos(2x+3))^2)$$

$$\frac{dy}{dx} = \cos((\cos(2x+3))^2) \cdot$$

$$2 \cdot \cos(2x+3) \cdot$$

$$(-\sin(2x+3)) \cdot$$

$$2$$

Rule

$\sin \circ$

power

$\cos \circ \sin \circ$

power
const

p. 153 #19 find dy/dx , confirm.

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

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

outside:
power $^{-1/2}$
inside:
polynom.

$$\frac{dy}{dx} = 3 \cdot \left(-\frac{1}{2}\right) (2x+1)^{-3/2} \cdot 2$$

$$= -3 (2x+1)^{-3/2}$$

$$\frac{\text{Radical}}{-3} \\ \frac{-3}{\sqrt{(2x+1)^3}}$$

Example: $y = \underbrace{\cos(2x)}_u \cdot \underbrace{3x^2}_v$

$$u' = -\sin(2x) \cdot 2 = -2\sin(2x) \quad v' = 6x$$

$$\begin{aligned} \frac{dy}{dx} &= u'v + uv' \\ &= -2\sin(2x) \cdot 3x^2 + \cos(2x) \cdot 6x \\ &= -6x^2 \sin(2x) + 6x \cos(2x) \\ &= 6x(\cos 2x - x \sin 2x) \end{aligned}$$

$$\begin{aligned}\text{Example: } y &= \tan(6x^2 - 5x + 1) \\ y' &= \sec^2(6x^2 - 5x + 1) \cdot (12x - 5) \\ &= (12x - 5) \sec^2(6x^2 - 5x + 1)\end{aligned}$$

$$\text{Example: } y = 3\cos^2 x - \sin^2 x + 5$$