

The Chain Rule (Homework)

Name
Date
Course

Find y' .

$$\textcircled{1} y = (3 - 4x)^2$$

$$\textcircled{2} y = \cot(x^2)$$

$$\textcircled{3} y = \cot^2 x$$

$$\textcircled{4} y = (\sqrt{x} + 3)^3$$

Find $\frac{dy}{dx}$.

$$\textcircled{5} y = \sqrt[5]{\frac{1}{2}x^3 + 6x^2 - 4}$$

$$\textcircled{6} y = \cos(-5x)$$

$$\textcircled{7} y = \tan(\sec x)$$

$$\textcircled{8} y = \sqrt{\sin x}$$

Find y' .

$$\textcircled{9} y = \sqrt[3]{\csc x - \cos x}$$

$$\textcircled{10} y = \sin(x^6)$$

$$\textcircled{11} y = \sin^6 x$$

$$\textcircled{12} y = \sec(8x^5 - 3x^2)$$

$$\textcircled{13} y = \csc(\tan x)$$

Find $\frac{dy}{dx}$.

$$\textcircled{14} y = -3(x^2 + 5x + 2)^2$$

$$\textcircled{15} y = \cos^2 x + (2x - 4)^6$$

$$\textcircled{16} y = \tan(\tan(\tan x))$$

$$(17) y = \sqrt[4]{(3x+5)^3 + 2}$$

$$(18) y = \csc^3(6x^8)$$

$$\textcircled{19} y = \sin^2(\cot(1-x))$$

$$\textcircled{20} y = (((1+3x)^2 + 8)^3 - 7)^4$$

Answers

① $-8(3-4x)$ or $-24+32x$

② $-2x \csc^2(x^2)$

③ $-2\cot x \csc^2 x$

④ $\frac{3(\sqrt{x}+3)^2}{2\sqrt{x}}$

⑤ $\frac{\frac{3}{2}x^2+12x}{5\sqrt[5]{(\frac{1}{2}x^3+6x^2-4)^4}}$ or $\frac{3x^2+24x}{10\sqrt[5]{(\frac{1}{2}x^3+6x^2-4)^4}}$

⑥ $5\sin(-5x)$

⑦ $\sec x \tan x \sec^2(\sec x)$

⑧ $\frac{\cos x}{2\sqrt{\sin x}}$

⑨ $\frac{\sin x - \csc x \cot x}{3\sqrt[3]{(\csc x - \cos x)^2}}$

⑩ $6x^5 \cos(x^6)$

⑪ $6\sin^5 x \cos x$

⑫ $(40x^4-6x)\sec(8x^5-3x^2)\tan(8x^5-3x^2)$

⑬ $-\sec^2 x \csc(\tan x) \cot(\tan x)$

⑭ $-6(x^2+5x+2)(2x+5)$

⑮ $-2\cos x \sin x + 12(2x-4)^5 = -\sin(2x) + 12(2x-4)^5$

⑯ $\sec^2 x \sec^2(\tan x) \sec^2(\tan(\tan x))$

⑰ $\frac{9(3x+5)^2}{4\sqrt[4]{[(3x+5)^2+2]^3}}$

⑱ $-144x^7 \csc^2(6x^8) \csc(6x^8) \cot(6x^8)$

⑲ $2 \csc^2(1-x) \sin(\cot(1-x)) \cos(\cot(1-x))$

⑳ $72(1+3x)((1+3x)^2+8)^2(((1+3x)^2+8)^3-7)^3$