Formulas for Calculating Derivatives (Part II) Homework

Find $f'(x)$.

① $f(x) = 1 - \cos x + 2x^{10}$

② $f(x) = -x^7 + \dfrac{\sin x}{4} + e$

③ $f(x) = 3\pi + \csc x - x + 8\sec x$

④ $f(x) = \cot x + \tan x + 7x$

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

⑤ $y = \sec x \csc x$

⑥ $y = x \cos x$

⑦ $y = \tan x \sin x$

⑧ $y = x^3 \cot x$

Find y'.

⑨ $y = -x + x^6 \sin x$

⑩ $y = -5x^5 - 2x^2 \csc x$

⑪ $y = -3\sec x - x^{11} \sin x$

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

⑫ $y = \frac{\cos x}{4x^4}$

(13) $y = \dfrac{-8x}{x^2 + 12}$

(14) $y = \dfrac{5x^2 - 17}{x^3 - 9}$

(15) $y = \dfrac{4}{\tan x + 2x^2}$

Find $f'(x)$.

(16) $f(x) = \dfrac{x^5}{\pi}$

(17) $f(x) = -\dfrac{\tan x}{9}$

(18) $f(x) = \dfrac{7x^3 + 5x + 8}{\sqrt{2}}$

Homework Answers

① $\boxed{\sin x + 20x^9}$

② $\boxed{-7x^6 + \frac{1}{4}\cos x}$

③ $\boxed{-\csc x \cot x - 1 + 8\sec x \tan x}$

④ $\boxed{-\csc^2 x + \sec^2 x + 7}$

⑤ $\sec x \tan x \csc x + \sec x(-\csc x \cot x) = \boxed{\sec^2 x - \csc^2 x}$

⑥ $\boxed{2\cos x - 2x\sin x}$

⑦ $7\sec^2 x \sin x + 7\tan x \cos x = \boxed{7\sec^2 x \sin x + 7\sin x}$

⑧ $3x^2 \cot x + x^3(-\csc^2 x) = \boxed{3x^2 \cot x - x^3 \csc^2 x}$

⑨ $\boxed{-1 + 6x^5 \sin x + x^6 \cos x}$

⑩ $\boxed{-25x^4 - 4x\csc x + 2x^2 \csc x \cot x}$

⑪ $\boxed{-3\sec x \tan x - 11x^{10}\sin x - x^{11}\cos x}$

⑫ $\dfrac{-4x^4 \sin x - 16x^3 \cos x}{16x^8} = \boxed{-\dfrac{x\sin x + 4\cos x}{4x^5}}$

⑬ $\boxed{\dfrac{8x^2 - 96}{(x^2 + 12)^2}}$

⑭ $\boxed{\dfrac{-5x^4 + 51x^2 - 90x}{(x^3 - 9)^2}}$

⑮ $\boxed{\dfrac{-4\sec^2 x - 16x}{(\tan x + 2x^2)^2}}$

⑯ $\boxed{\dfrac{5}{\pi}x^4}$

⑰ $\boxed{-\dfrac{1}{9}\sec^2 x}$

⑱ $\boxed{\dfrac{21}{\sqrt{2}}x^2 + \dfrac{5}{\sqrt{2}}}$ or $\boxed{\dfrac{21\sqrt{2}}{2}x^2 + \dfrac{5\sqrt{2}}{2}}$