

REVISION - SHEET
[DIFFERENTIATION]

XIIth

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026/418

① $f(x) = |\cos x|$ find $f'(\pi/4)$ and $f'(3\pi/4) = ?$

② $f(x) = |\cos x - \sin x|$ find $f'(\pi/6)$ and $f'(\pi/3) = ?$

③ $f(x) = |\log x|$, $x > 0$ find $f'(1/2) = ?$
 $f'(e) = ?$

④ $y = \sin^{-1} \left(\frac{a + b \cos x}{b + a \cos x} \right)$ find $y' = ?$

⑤ $y = \log_7 (\log_7 x)$ find $y' = ?$

⑥ $y = \int \log \left\{ \sin \left(\frac{x^2}{3} - 1 \right) \right\}$

⑦ $y = (x + \sqrt{x^2 + a})^n$ Prove that $\frac{dy}{dx} = \frac{ny}{\sqrt{x^2 + a}}$

⑧ $y = \frac{x \sin^{-1} x}{\sqrt{1-x^2}} + \log(\sqrt{1-x^2})$

Prove that $\frac{dy}{dx} = \frac{\sin^{-1} x}{(1-x^2)^{3/2}}$

⑨ $y = \log_{10} x + \log_x 10 + \log_x x + \log_{10} 10$ find $y' = ?$

⑩ $y = \sqrt{a^2 + x^2} + \sqrt{a^2 - x^2}$

Show that

$\sqrt{a^2 + x^2} - \sqrt{a^2 - x^2}$

$\frac{dy}{dx} = \frac{-2a^2}{x^3} \left\{ 1 + \frac{a^2}{\sqrt{a^2 - x^2}} \right\}$

⑪ $y = \sqrt{\frac{1-x}{1+x}}$ Prove that

$(1-x^2) \frac{dy}{dx} + y = 0$

⑫ If $f(x) = \sqrt{x^2 + 1}$, $g(x) = \frac{x+1}{2}$ and $h(x) = 2x-3$ find $f'(h(g(x)))$