

$$\begin{aligned}
 & (1+x^y)^x x = \\
 & (1+x^y)^x x^{\partial} = \\
 & (1+x^y)^x x^{y \cdot y^x} = \\
 & (1+x^y)^x x^{y^x \cdot y^x} = \\
 & (x^y x)^{\partial} = \boxed{(x^y)^{\partial} x^{\partial}} \\
 & \cancel{x^y} (x^y)^{\partial} = x^y
 \end{aligned}$$

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 & \cancel{x^y} x^{\partial} = \\
 & \cancel{x^y} x^{\partial} = (x^y)^{\partial} \\
 & \cancel{x^y} x^{\partial} = x^y \\
 & \cancel{x^y} x^{\partial} = x^y
 \end{aligned}$$

$$I = f(y) + \frac{0}{y}$$

(1)

3.

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1.

$$\begin{aligned}
 & 2(x^4 + 2x^2y^2 + y^4) \\
 & = 25(x^4 - 2x^2y^2 + y^4)
 \end{aligned}$$

$$23x^4 - 6x^2y^2 + 23y^4 = 0$$

$$(23y^4)x^3 - 12x^2y^2 + 2x^2y \frac{dy}{dx} + (23x^4)y^3 \frac{dy}{dx} = 0$$

$$\frac{dy}{dx} \left(\frac{12x^2y^2 - 92x^3}{92y^3 - 12x^2y} \right) = \frac{12x^2y^2 - 92x^3}{92y^3 - 12x^2y}$$

$$\begin{aligned}
 & \frac{12 - 12x^3}{92} = \frac{-2 + 72}{-16} \\
 & \frac{12 - 108}{92} = \frac{309}{2} \\
 & \frac{-96}{92} = \frac{309}{2} \\
 & \frac{24}{23} = \frac{309}{2}
 \end{aligned}$$

$$y = \frac{309}{2}x - \frac{925}{2}$$

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2.

$$\begin{aligned}
 f'(x) &= -2\sin x + 2\cos 2x \\
 f'(x) &= 0 \Leftrightarrow \sin x = \frac{1}{2} \sin x = \frac{\pi}{6}, \frac{5\pi}{6}
 \end{aligned}$$

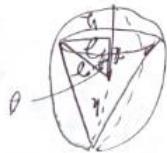
$$\begin{aligned}
 \sin x &= \cos 2x \\
 \frac{\pi}{3} & \quad \frac{\pi}{2} \\
 f'(x) &= 2
 \end{aligned}$$

$$\begin{aligned}
 [0, \frac{\pi}{2}] \text{ 최대는 } x &= \frac{\pi}{6} \\
 \frac{3\sqrt{3}}{2} & \quad x = \frac{\pi}{2}
 \end{aligned}$$

$$\begin{aligned}
 \frac{3}{2}\sqrt{3} & \quad \frac{3\sqrt{3}}{2} \\
 \frac{3}{2} & \leq 0
 \end{aligned}$$

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$$\begin{aligned}
 & \text{Diagram of a circle with radius } l \text{ and angle } \theta. \\
 & \cos \theta = \frac{l}{r} = \frac{1}{2} \quad \sin \theta = \frac{\sqrt{3}}{2} \\
 & \cos^2 \theta + \sin^2 \theta = 1 \\
 & \cos 2\theta = \cos^2 \theta - \sin^2 \theta = \frac{1}{2} \\
 & \sin 2\theta = 2 \sin \theta \cos \theta = \sqrt{3}/2 \\
 & \tan 2\theta = \frac{\sin 2\theta}{\cos 2\theta} = \sqrt{3} \\
 & \text{Diagram of a right-angled triangle with hypotenuse } l \text{ and angles } \alpha, \beta, \gamma. \\
 & \cos \alpha = \frac{a}{l}, \quad \sin \alpha = \frac{b}{l} \\
 & \cos \beta = \frac{b}{l}, \quad \sin \beta = \frac{a}{l} \\
 & \cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta = 0 \\
 & \cos(\alpha + \beta) = \cos \gamma = 0
 \end{aligned}$$



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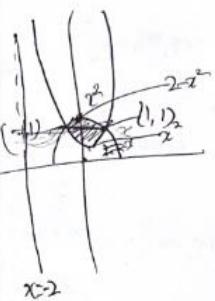
$$\begin{aligned}
 5. \quad \cos x &= t \\
 -\sin x &= \frac{dt}{dx}
 \end{aligned}$$

$$\begin{aligned}
 \sin 2\theta &= 2 \sin \theta \cos \theta \\
 \sin 4\theta &= 2 \sin 2\theta \cos 2\theta \\
 \therefore \sin 2\theta &= 2(\cos \theta \sin \theta)
 \end{aligned}$$

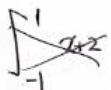
$$\sin \theta = 8x$$

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6.



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$$\int_{-1}^1 2\pi(2x)(2-x^2) dx$$

$$\begin{aligned}
 & 2\pi \int_{-1}^1 (2x)(2-x^2) dx \\
 & = 2\pi \left[2x^2 - \frac{x^4}{4} \right]_{-1}^1 \\
 & = 1 - \frac{1}{2} \\
 & = 2(4 - 2\frac{1}{4}) \\
 & = 2(4 - 2\frac{1}{4}) \\
 & = 2\left[4x - \frac{x^3}{3} \right]_1^{-1} \\
 & = 4 - \frac{4}{3} + 4 + \frac{4}{3}
 \end{aligned}$$

$$\begin{aligned}
 & 4 - \frac{4}{3} \\
 & = \frac{32}{3} \pi
 \end{aligned}$$

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7.

$$\arctan(x)$$

$[a, b]$ 에서 $\int_a^b f(x) dx$

$$Df(x) = \frac{1}{b-a} \int_a^b f(x) dx$$

$$\int_0^{\frac{\pi}{6}} \sec^3 x dx$$

$$= \int_0^{\frac{\pi}{6}} \sec x \times \sec x dx \quad (\text{제공식})$$

$$= \sec x \tan x - \int \sec x \tan^2 x dx$$

$$= " - \int \sec x (\sec^2 x - 1) dx$$

$$= " - \int \sec^3 x dx + \int \sec x dx$$

$$\left[\frac{1}{2} (\sec x \tan x + \int \sec x dx) \right]_0^{\frac{\pi}{6}}$$

$$\ln |\sec x + \tan x|$$

$$\frac{\sqrt{2}x + \ln(1+\sqrt{2})}{2}$$

$$\frac{\pi}{6} - 0$$

$$\frac{2\sqrt{2} + 2\ln(1+\sqrt{2})}{2\pi}$$

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8.

$$\arctan x$$

$$= \int_{\arctan^{-1}(a)}^{\arctan^{-1}(b)} dx$$

$$= " - t$$

$$\frac{1}{1+t^2} = \frac{dt}{dx}$$

$$dt = dx/(1+x^2)$$

$$\int (x^2+1)^{-1} dt$$

$$= \frac{1}{2} ($$

제공식

$$\int x \tan^{-1}(x) dx = \frac{x^2}{2} \tan^{-1}(x) - \frac{1}{2} \int \frac{x}{x^2+1} dx + C$$

$$\frac{1}{2} \int \frac{1}{x^2+1}$$

$$= \frac{1}{2} (x^2 \tan^{-1}(x) - \int (1-x^2)^{-1} dx) + C$$

$$= \frac{1}{2} (x^2 \tan^{-1}(x) - x + \tan^{-1} x) + C$$

$$= \frac{1}{2} ((x^2-1) \tan^{-1}(x) - x) + C$$