$x = 8\tan\theta$

$\frac{dx}{d\theta} = 8\sec^2\theta$

$dx = 8\sec^2\theta\, d\theta$

$x^2 + 8^2 = 8^2\tan^2\theta + 8^2$

$= 8^2(\tan\theta + 1)$

$= 64\sec^2\theta$

$$\int \frac{8\sec^2\theta\, d\theta}{64\sec^2\theta} = \int \frac{d\theta}{8} = \frac{1}{8}\int d\theta$$

$= \frac{1}{8}(\theta) + c$

$= \frac{1}{8}\tan^{-1} \cdot \frac{1}{8} + c$

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(1) $\frac{dx}{x^2+7}$

$= \int \frac{dx}{x^2+7}$

$x = 7\tan\theta$

$\frac{dx}{d\theta} = 7\sec^2\theta$

$dx = 7\sec^2\theta\, d\theta$

$x^2+7 = 7^2\tan^2\theta + 7$

$7(1^2\tan^2\theta + 1)$

$= 7\sec^2\theta$

$\therefore \int \frac{7\sec^2\theta\, d\theta}{1\sec^2\theta} = \int \frac{d\theta}{1} =$

$= 1[0] + c$

$= 1\tan^{-1}x + c$

2) $\frac{dx}{x^2+64}$

$= \int \frac{dx}{x^2+8^2}$