



$$\left. \begin{aligned} & \int \frac{1}{x^2 + 1} dx \\ & = \int \frac{x + 1}{x^2 + 1} dx \\ & = \int \frac{x}{x^2 + 1} dx + \int \frac{1}{x^2 + 1} dx \\ & = \frac{1}{2} \ln|x^2 + 1| + \arctan x + C \end{aligned} \right\} (4)$$

$$\left. \begin{aligned} & \int \frac{x-1}{x^2 + 1} dx \\ & = \int \frac{x}{x^2 + 1} dx - \int \frac{1}{x^2 + 1} dx \\ & = \frac{1}{2} \ln|x^2 + 1| - \arctan x + C \end{aligned} \right\} (1)$$

$$\left. \begin{aligned} & \int \frac{x+1}{x^2 - 1} dx \\ & = \int \frac{x+1}{(x-1)(x+1)} dx \\ & = \int \frac{1}{x-1} dx \\ & = \ln|x-1| + C \end{aligned} \right\} (5)$$

$$\left. \begin{aligned} & \int \frac{x}{x^2 - 1} dx \\ & = \int \frac{x}{(x-1)(x+1)} dx \\ & = \frac{1}{2} \ln|x-1| - \frac{1}{2} \ln|x+1| + C \end{aligned} \right\} (6)$$

$$\left. \begin{aligned} & \int \frac{1}{x^2 - 1} dx \\ & = \frac{1}{2} \ln|x-1| - \frac{1}{2} \ln|x+1| + C \end{aligned} \right\} (7)$$

$$\left. \begin{aligned} & \int \frac{1}{x^2 + 1} dx \\ & = \arctan x + C \end{aligned} \right\} (8)$$



$$\text{د س } \left[\frac{1}{\frac{1}{2} \text{ س} - \frac{1}{2} \text{ د}} \right] \text{ (9)}$$

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$$\text{د س } \left[\frac{1}{\frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}} \right] =$$

$$\text{د س } \left[\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} (\text{د} - \text{س})} \right] =$$

درجہ اولیٰ < درجہ
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$$\text{د س } \left[\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}} \right] =$$

$$\frac{\frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}}{1 + \frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}} = \frac{\frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}}{\frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}}$$

$$\text{د س } \left[\frac{1}{1 + \frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}} \right] =$$

$$\text{د س } \left[\frac{1}{1 + \frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}} \right] =$$

نفرینا

$$\text{د س } \left[\frac{1}{1 + \frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}} \right] =$$

$$\text{د س } \left[\frac{1}{1 + \frac{1}{2} \text{ د} - \frac{1}{2} \text{ س}} \right] =$$

$$\text{د س } \left[\frac{\frac{1}{2} \text{ د}}{1 + \frac{1}{2} \text{ د}} \right] \text{ (10)}$$

$$\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} \text{ د}} = \text{د س } \left[\frac{\frac{1}{2} \text{ د}}{1 + \frac{1}{2} \text{ د}} \right] = \frac{\frac{1}{2} \text{ د}}{1 + \frac{1}{2} \text{ د}}$$

$$\text{د س } \left[\frac{1}{1 + \frac{1}{2} \text{ د}} \right] = \frac{\frac{1}{2} \text{ د}}{1 + \frac{1}{2} \text{ د}}$$

السط مشتقاً لتمام

$$\text{د س } \left[\frac{1}{1 + \frac{1}{2} \text{ د}} \right] =$$

$$\text{د س } \left[\frac{1}{1 + \frac{1}{2} \text{ د}} \right] =$$

$$\text{د س } \left[\frac{1}{\frac{1}{2} (\text{د} + \text{س})} \right] \text{ (11)}$$

$$\frac{1}{\frac{1}{2} \text{ د}} = \frac{\text{د س}}{\frac{1}{2} \text{ د}} \left[\frac{1}{\frac{1}{2} (\text{د} + \text{س})} \right] = \text{د س}$$

$$\text{د س } \left[\frac{1}{\frac{1}{2} (\text{د} + \text{س})} \right] = \text{د س}$$

$$\text{د س } \left[\frac{1}{\frac{1}{2} (\text{د} + \text{س})} \right] = \text{د س}$$

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$$\text{د س } \left[\frac{1}{\frac{1}{2} (\text{د} + \text{س})} \right] =$$

كسور جزئية

$$\text{د س } \left[\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} (\text{د} + \text{س})} \right] =$$

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$$\text{د س } \left[\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} (\text{د} + \text{س})} \right] =$$

$$\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} \text{ د}} = \text{د س } \left[\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} (\text{د} + \text{س})} \right] = \frac{\frac{1}{2} \text{ د}}{\frac{1}{2} (\text{د} + \text{س})}$$

$$\text{د س } \left[\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} (\text{د} + \text{س})} \right] =$$

$$\text{د س } \left[\frac{\frac{1}{2} \text{ د}}{\frac{1}{2} (\text{د} + \text{س})} \right] =$$



$$\begin{aligned}
 & \left[\frac{w^c}{w+1} \right] \\
 & = \left[\frac{w^c}{w+1} \right] \\
 & = \left[\frac{w^c}{w+1} \right] \\
 & w = \frac{w^c}{w+1} \\
 & \frac{w^c}{w+1} = w \\
 & \left[\frac{w^c}{w+1} (w+1) \right] \\
 & = w^c + 1 \\
 & A + \frac{w^c}{0} + \frac{w^c}{1} + w = \\
 & A + \frac{w^c}{0} + \frac{w^c}{1} + w =
 \end{aligned}$$

$$\begin{aligned}
 & \left[\frac{w^c}{w+1} \right] \\
 & = \left[\frac{w^c}{w+1} \right] \\
 & = \left[\frac{w^c}{w+1} \right] \\
 & w = \frac{w^c}{w+1} \\
 & \frac{w^c}{w+1} = w \\
 & \left[\frac{w^c}{w+1} (w+1) \right] \\
 & = w^c + 1 \\
 & A + \left(\frac{w^c}{0} + \frac{w^c}{1} - w \right) = \\
 & A + \frac{w^c}{0} + \frac{w^c}{1} - w =
 \end{aligned}$$

$$\begin{aligned}
 & \left[\frac{w^c}{w+1} \right] \\
 & = \left[\frac{w^c}{w+1} \right] \\
 & w^c (w+1) = w^c \\
 & \frac{1}{w+1} = \frac{w^c}{w+1} \\
 & \left[\frac{w^c}{w+1} \right] + \frac{w^c}{w+1} = I \\
 & A + \frac{w^c}{w+1} + \frac{w^c}{w+1} =
 \end{aligned}$$

$$\begin{aligned}
 & \left[\frac{w^c}{w+1} \right] \\
 & = \left[\frac{w^c}{w+1} \right] \\
 & w^c (w+1) = w^c \\
 & \frac{1}{w+1} = \frac{w^c}{w+1} \\
 & \left[\frac{w^c}{w+1} \right] + \frac{w^c}{w+1} = I \\
 & A + \frac{w^c}{w+1} + \frac{w^c}{w+1} =
 \end{aligned}$$



$$\begin{aligned} & \left. \frac{1 + \sqrt{2s}}{\sqrt{2s}} \right\} \textcircled{16} \\ & \left. \frac{1 + \sqrt{2s}}{\sqrt{2s}} + \frac{1}{\sqrt{2s}} \right\} = \\ & \left. \frac{1}{\sqrt{2s}} + \frac{1}{\sqrt{2s}} \right\} = \\ & \left. \frac{1}{\sqrt{2s}} + \frac{1}{\sqrt{2s}} \right\} = \\ & = \frac{1}{\sqrt{2s}} + \frac{1}{\sqrt{2s}} \end{aligned}$$

$$\begin{aligned} & \left. \frac{\sqrt{2s+1}}{s} \right\} \textcircled{17} \\ & \left. \frac{1}{s} + \frac{1}{s} \right\} = \\ & \frac{1}{s} = \sqrt{2s+1} \leftarrow \frac{1}{s} = \sqrt{2s+1} \\ & \frac{1}{s} = \sqrt{2s+1} \\ & \frac{1}{s} = \sqrt{2s+1} \\ & \frac{1}{s} = \sqrt{2s+1} \\ & \frac{1}{s} = \sqrt{2s+1} \\ & \frac{1}{s} = \sqrt{2s+1} \\ & \frac{1}{s} = \sqrt{2s+1} \end{aligned}$$

$$\begin{aligned} & \left. \frac{1}{\sqrt{2s+1}} \right\} \textcircled{12} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \end{aligned}$$

كسور جزئية

$$\begin{aligned} & \left. \frac{1}{\sqrt{2s+1}} \right\} \textcircled{15} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \\ & \frac{1}{\sqrt{2s+1}} = \sqrt{2s+1} \end{aligned}$$



$$\begin{aligned} & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \end{aligned}$$

$$\begin{aligned} & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \end{aligned}$$

$$\begin{aligned} & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \end{aligned}$$

نعمل كسور جزئية

$$\begin{aligned} & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \\ & \left[\frac{1}{s} \right] = \frac{1}{s} \end{aligned}$$



$$c_2 \left[\frac{(1 - \frac{1}{s})^0}{s} \right]$$

$$\frac{1}{s} = \frac{1}{s} \leftarrow \frac{1}{s} - 1 = \frac{1}{s} - \frac{s}{s}$$

$$\frac{1}{s} = \frac{1}{s} \leftarrow \frac{1}{s} - 1 = \frac{1}{s} - \frac{s}{s}$$

$$= \left[\frac{1}{s} - \frac{s}{s} \right]$$

$$= \frac{1}{s} + \frac{1}{s}$$

$$= \frac{1}{s} + \frac{1}{s} \left(\frac{1}{s} - 1 \right)$$

$$c_2 \left[\frac{1}{s - \frac{1}{s}} \right]$$

$$= \frac{1}{s \left(\frac{1}{s} - 1 \right)}$$

$$\frac{1}{s} \times 1 = \frac{1}{s} \leftarrow \frac{1}{s} - 1 = \frac{1}{s} - \frac{s}{s}$$

$$\frac{1}{s} = \frac{1}{s} \leftarrow \frac{1}{s} - 1 = \frac{1}{s} - \frac{s}{s}$$

$$= \frac{1}{s} \times \frac{1}{\left(\frac{1}{s} - 1 \right)}$$

$$= \frac{1}{s} \left[\frac{1}{s} - 1 \right]$$

$$= \frac{1}{s} \left[\frac{1}{s} - 1 \right]$$

$$c_3 \left[\frac{s^2 - 1}{s} \right]$$

$$= \frac{s^2 - 1}{s}$$

$$= \left[\frac{s^2}{s} - \frac{1}{s} \right]$$

$$= \left[\frac{s^2}{s} - \frac{1}{s} \right] - \frac{1}{s} \times \frac{1}{s} = \frac{s^2}{s} - \frac{1}{s} - \frac{1}{s}$$

$$= \frac{s^2}{s} - \frac{1}{s} - \frac{1}{s}$$

$$= \frac{1}{s} + \frac{1}{s}$$

$$c_4 \left[\frac{s^2 - 1}{s} \right]$$

$$= \frac{s^2 - 1}{s}$$

اجزاء مرة اخرى

$$= \frac{s^2 - 1}{s}$$

$$= \frac{s^2 - 1}{s}$$

$$= \frac{s^2 - 1}{s}$$

التكامل النهائي

$$= \frac{s^2 - 1}{s}$$

$$= \frac{s^2 - 1}{s}$$

البيانات متفق
المقام

$$c_6 \left[\frac{s^2 + 10s + 10}{s} \right]$$

$$= \frac{(s^2 + 10s + 10)}{s}$$

$$= \frac{1}{s} \left[\frac{1}{s^2 + 10s + 10} \right]$$



$$(24) \int \frac{u^2 \cos u}{2 - \cos u} du$$

$$u = 2 - \cos u \Rightarrow u - 2 = -\cos u \Rightarrow \cos u = 2 - u$$

$$\frac{u^2 \cos u}{2 - \cos u} = \frac{u^2 (2 - u)}{2 - \cos u}$$

عندما $u = 0$ فإن $\cos u = 2$
عندما $u = \pi$ فإن $\cos u = 0$

$$\int \frac{u^2 (2 - u)}{2 - \cos u} du = \int \frac{2u^2 - u^3}{2 - \cos u} du$$

$$\int \frac{1}{2 - \cos u} du = \frac{1}{2} \int \frac{1}{1 - \frac{\cos u}{2}} du$$

$$\frac{1}{2} \int \frac{1}{1 - \frac{\cos u}{2}} du = \frac{1}{2} \int \frac{1}{1 - \frac{e^{iu} + e^{-iu}}{4}} du$$

$$(25) \int \frac{u^2 \cos u}{\cos u} du$$

$$\int u^2 \cos u du = \int u^2 \cos u du$$

$$\int u^2 (\cos u + 1) \frac{1}{2} du = \frac{1}{2} \int u^2 (\cos u + 1) du$$

$$\int u^2 (\cos u + 1) du = \int u^2 \cos u du + \int u^2 du$$

$$\int u^2 \cos u du + \int u^2 du = \int u^2 \cos u du + \frac{u^3}{3}$$

مباشر
أجزاء

$$(26) \int \frac{u^2}{u^2 + 1} du$$

$$\int \frac{u^2}{u^2 + 1} du = \int \frac{u^2 + 1 - 1}{u^2 + 1} du = \int \left(1 - \frac{1}{u^2 + 1} \right) du$$

$$\int \frac{u^2}{u^2 + 1} du = \int 1 du - \int \frac{1}{u^2 + 1} du = u - \arctan u + C$$

$$\int \frac{u^2}{u^2 + 1} du = \int \frac{u^2 + 1 - 1}{u^2 + 1} du = \int \left(1 - \frac{1}{u^2 + 1} \right) du$$

$$\int \frac{u^2}{u^2 + 1} du = \int \frac{1}{2} \left(1 + \frac{1}{u^2} \right) du = \frac{1}{2} \left(u + \frac{1}{u} \right) + C$$

$$\int \frac{u^2}{u^2 + 1} du = \frac{1}{2} \left(u + \frac{1}{u} \right) + C$$

نظريتنا $u = 1 + \frac{1}{u}$ تم نحل
بالقول

(27) إذا كان $u = 1$ عند $u = 0$ و $u = 2$ عند $u = \pi$
عند $u = 0$ فإن $\cos u = 1$
عند $u = \pi$ فإن $\cos u = -1$

$$\int \frac{u^2 \cos u}{u^2 + 1} du$$

الكل: $u = \cos u$
 $u = \cos u$
 $u = \cos u$

$$\int \frac{u^2 \cos u}{u^2 + 1} du = \int \frac{u^2 \cos u}{u^2 + 1} du$$

$$\int \frac{u^2 \cos u}{u^2 + 1} du = \int \frac{u^2 \cos u}{u^2 + 1} du$$

$$(2 - u) - (u - 2) = 2 - u - u + 2 = 4 - 2u$$

$$4 - 2u = 4 - 2u$$

$$4 - 2u = 4 - 2u$$