(3) $\int \frac{x^2+1}{(x^2-2x+2)^2}\,dx$

$= \int \frac{x^2+1}{[(x-1)^2+1]^2}\,dx$

$u = x-1$

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

$u = \tan\theta$

$\sqrt{1+u^2} \rightarrow$ Trig Sub

$= \int \frac{(\tan\theta+1)^2+1}{\sec^4\theta}\sec^2\theta\,d\theta$

$= \int \cos^2\theta\left[(\tan\theta+1)^2+1\right]d\theta$

$= \int \cos^2\theta\,d\theta + \int \cos^2\theta(\tan\theta+1)^2\,d\theta$ ($\tan\theta = \frac{\sin\theta}{\cos\theta}$)

$= \int \cos^2\theta\,d\theta + \int (\sin\theta+\cos\theta)^2\,d\theta$

$= \int \cos^2\theta\,d\theta + \int \sin^2\theta\,d\theta + \int \cos^2\theta\,d\theta + \int 2\sin\theta\cos\theta\,d\theta$

$\int 1\,d\theta$

$= \int 1\,d\theta + \int \frac{\cos 2\theta+1}{2}\,d\theta + \int \sin 2\theta\,d\theta$

$= \theta + \frac{\sin 2\theta}{4} + \frac{\theta}{2} - \frac{\cos 2\theta}{2} + c$

$= \frac{3\theta}{2} + \frac{\sin 2\theta}{4} - \frac{\cos 2\theta}{2} + c$

$= \frac{3\tan^{-1}u}{2} + \frac{\frac{2u}{1+u^2}}{4} - \frac{\frac{1-u^2}{1+u^2}}{2} + c$

$= \frac{3\tan^{-1}u + \frac{u^2+u-1}{1+u^2}}{2} + c$ ←

$1 + \frac{u-2}{1+u^2}$

$= \frac{3\tan^{-1}u + \frac{u-2}{1+u^2}}{2} + \frac{1}{2} + c$

$= \frac{3\tan^{-1}(x-1) + \frac{x-3}{1+(x-1)^2}}{2} + c'$