Electric charges can be obta... without touching it, by a process called electrostatic induction.

Consider a negatively charged rubber rod brought near a conducting sphere that is insulated so that th... shown below.


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## Assignment

1. $\int \frac{2x}{\sqrt{4x^2-1}}\,dx = \int \frac{2x}{(4x^2-1)^{1/2}}$

$= 2\int \frac{U}{(4x^2-1)^{1/2}}\,dx$

$U = (4x^2-1)^{1/2}$

$U^2 = 4x^2 - 1 \implies U^2 + 1 = 4x^2$

$x = \sqrt{\frac{U^2+1}{4}} \quad \therefore x = \left(\frac{U^2+1}{4}\right)^{1/2}$

$\frac{dx}{du} = \frac{1}{2}\left(\frac{U^2+1}{4}\right)^{-1/2} \times \frac{U}{2}$

$dx = \frac{U\,du}{4}\left(\frac{U^2+1}{4}\right)^{-1/2}$

$2\int \left(\frac{U^2+1}{4}\right)^{1/2} \times \frac{1}{U} \times \frac{U\,du}{4}\left(\frac{U^2+1}{4}\right)^{-1/2}$

$\frac{2}{4}\int \frac{U}{U}\,du$

$\frac{2}{4}\int du = \frac{1}{2}[U] + c$

$= \frac{\sqrt{4x^2-1}}{2} + c$

brought ...

$^{-1}$) and the pure ...

2. $\int \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$

soln

$\int \sin^{-1} x \times (\sqrt{1-x^2})^{-1} dx$

$u = \sin^{-1} x$

$\frac{du}{dx} = \frac{1}{\sqrt{1-x^2}}$

$du = \frac{dx}{\sqrt{1-x^2}}$

$du = (\sqrt{1-x^2})^{-1} dx$

$\int u \, du$

$\frac{u^2}{2} + c$

$= \frac{(\sin^{-1} x)^2}{2} dx$

on an object without touching it, by a process called

rubber rod brought near a neutral (uncharged)

d so that there is no conducting path to ground as

between the ...

$n^{-1}$) and the

3. $\int (\tan x)^6 \sec^2 x \, dx$

<u>soln</u>

$u = \tan x$

$\frac{du}{dx} = \sec^2 x$

$du = \sec^2 x \, dx$

$= \int u^6 \, du$

$= \left[\frac{u^7}{7}\right] + c$

$= \frac{(\tan x)^7}{7} + c$