Re: Substitutions in Indefinite Ingegration With a Single Variable

Source: http://sci.tech−archive.net/Archive/sci.math/2007−05/msg04172.html

- *From*: magidin@xxxxxxxxxxxxxxxxx (Arturo Magidin)

- *Date*: Thu, 24 May 2007 14:51:36 +0000 (UTC)

In article <1179948276.219396.27150@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>,
BrandonFromFlorida <BrandonShw@xxxxxxx> wrote:

> On May 23, 12:34 pm, magi...@xxxxxxxxxxxxxxxxx (Arturo Magidin) wrote:
>
> > In article <1179914905.640343.207...@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>,
>
> > ....If you want to do the integral of 1/(1−x^2), then you do partial
> > fractions, not a substitution.
>
> I know that's a partial fractions problem, and I've known it for about
> 35 years since I was in college. In fact it's one of the most classic
> partial fractions integrations. I didn't ask you how to integrate
> it. My question was, if a hypothetical student asks if the
> substitution x = sin(theta), which worked in 1/SQRT(1−x^2) can be
> applied to 1/(1−x^2), is it valid for me to simply answer "No, because
> the function being substituted has a much smaller range than the
> integrand?"

Do you remember how you started this thread? You started by saying
that the integrand was "nice" or well−behaved, or some such.

1/(1−x^2) is NOT "nice" and not "well−behaved". Its domain is
disconnected. When you do an indefinite integral, you have implicit
assumptions in there.

You can certainly do a substitution with x=sin(u). HOWEVER, that
substitution will only yield a valid antiderivative in a certain part
of the domain of the function, namely, the connected component
(−1,1).

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"It's not denial. I'm just very selective about

what I accept as reality."
−−− Calvin ("Calvin and Hobbes" by Bill Watterson)
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