

Re: Definite integral from a to b of sqrt(x) (one-valued vs. multi-valued)

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On Wed, 28 Nov 2007 15:21:44 -0800 (PST), pfmtjux@xxxxxxxxx wrote:

Given that $0 < a < b$, the definite integral from a to b of \sqrt{x} yields a positive value c. That's true if we treat \sqrt{x} as a one-valued function.

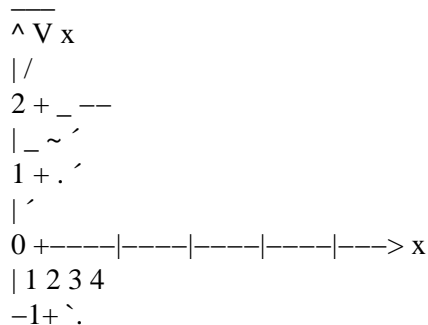
We do not have to "treat" \sqrt{x} as a single-valued function, but $x \mapsto \sqrt{x}$ just IS a single-valued function (at least in "standard" math, i.e., say, Real Analysis).

Moreover,

$\sqrt{x} \geq 0$ for all $x \in \mathbb{R}, x \geq 0$.

Now, I've sometimes seen the graph of \sqrt{x} drawn as a multi-valued function and it looks like a "C".

Well actually this figure isn't the graph of the function $x \mapsto \sqrt{x}$, but consists of two graphs, namely the graph of the function $x \mapsto \sqrt{x}$ and the graph of the function $x \mapsto -\sqrt{x}$.



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

In such circumstances, is it correct to say that said definite integral yields $\pm c$?

No. (Since $\sqrt{x} \geq 0$ for all $x \in \mathbb{R}, x \geq 0$.)

Does it make sense to use multi-valued functions in an integral, or must one necessarily use one-valued functions?

Well, at least the definition of an \int I learned, only involved "one-valued functions".

F.

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