

Math hygiene

MATH 202

Fall 2023

The whole problem with the world is that fools and fanatics are always so certain of themselves, and wiser people so full of doubts.

Bertrand Russell

Let's Play True or False

True or False: teddy bear, stinkbug, guacamole.

Answer This is not a statement—it's a list of things; it doesn't have a truth value. I'd say it's a trick question.

True or False redact

True or False: In my house this morning, you'll find either a teddy bear, a stinkbug, or guacamole.

Answer This is true. This morning I opened my fridge. On the middle shelf there was a container that passed the guacamole color, texture, and taste test; therefore it is true that in my house this morning, you'll find either a teddy bear, a stinkbug, or guacamole.

Now with math

Question Is the following work correct?

$$\int_3^4 x \, dx = \frac{1}{2}x^2 = \frac{7}{2}$$

Answer Just like the list “teddy bear, stinkbug, guacomole,” this is a list of things. As such, it’s not a statement, and it doesn’t have a truth value. It’s another trick question.

Question Is the following work correct?

$$\int_3^4 x \, dx = \frac{1}{2} x^2 \Big|_3^4 = \frac{7}{2}$$

Answer Yes, this work is correct. This time we're given something that has a truth value. And its truth value is true.

The Mad Gardener

Question Is this work correct? (Lewis Carroll, From *The Mad Gardener's Song*)

*He thought he saw an Argument
That proved he was the Pope:
He looked again, and found it was
A Bar of Mottled Soap.
"A fact so dread," he faintly said,
"Extinguishes all hope!*

Answer It's amusing nonsense poetry—it's meaningless and neither correct nor incorrect. Another trick question.

Question Is this work correct?

$$\begin{aligned}\int_2^3 \sqrt{x+1} \, dx &= \int \sqrt{z} \\ &= \int \frac{3}{2}(1+z)^{3/2} \\ &= \frac{3}{2}(4^{3/2} - 3^{3/2})\end{aligned}$$

Answer Unlike the *The Mad Gardener's Song*, this is **nonamusing** nonsense. It's meaningless and neither correct nor incorrect. It's yet another trick question.

Comment Work like this (a) confuses me (b) should confuse you, and (c) is the result of **abject sloth**.

Let $z = x + 1$. Then $dz = dx$. Further $x = 2$ implies $z = 3$; and $x = 3$ implies $z = 4$. Now that we have gathered our four ingredients, we have

$$\begin{aligned}\int_2^3 \sqrt{x+1} \, dx &= \int_3^4 \sqrt{z} \, dz, \\ &= \frac{2}{3} z^{3/2} \Big|_3^4, \\ &= \frac{2}{3} \left(4^{3/2} - 3^{3/2} \right).\end{aligned}$$

First Amendment Rights

Question Which answer is simplified:

$$\int_2^3 \sqrt{x+1} \, dx = \frac{2}{3} (4^{3/2} - 3^{3/2})$$

or

$$\int_2^3 \sqrt{x+1} \, dx = \frac{16}{3} - 2\sqrt{3}$$

Answer Arguably $\frac{16}{3} - 2\sqrt{3}$ is more simple than is $\frac{2}{3} (4^{3/2} - 3^{3/2})$ because it has one, not two radicals. But I consider this a first Amendment Rights issue. Either answer is OK. If your answer is $\frac{2}{3} (4^{3/2} - 3^{3/2})$ and you like it, I say let it be (LIB).