Math Diversion Problem 708

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> Wisdom is the ability to make decisions that
> you won't regret in the long run.
> — The Author

The YouTube video is found at:

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Source: The Ether of Great Mathematical Ideas
Title: Initial Percent Change
 Presenter: Patrick
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1 The Problem

I was inspired to invent an SAT-style problem from reading a real SAT problem from years ago. Copilot helped me gather some facts to make the problem authentic.

The problem concerns the firing off a hobbyist field rocket. Copilot gave me specs for a currently available hobbyist rocket to go by.

Assuming a steady fuel consumption rate of 7.625 grams/sec for a hobbyist field rocket, what percent of the original fuel capacity is consumed in the first 0.2 second, if the original weight of the fuel is 12.2 grams?

2 The Solution

To find the percent of the fuel consumed in the first 0.2 sec, all we have to do is to multiply the fractional amount of fuel consumed by 100%, or

$$\%\text{ of the fuel consumed} = (\text{fractional amount of fuel consumed}) \times 100\%\,. \quad (1)$$

So, what's the fractional amount of fuel consumed in the first 0.2 seconds of flight? It is

$$\text{fractional amount of the fuel consumed} = \frac{\text{fuel consumed in 0.2 sec}}{\text{initial amount of fuel}}\,. \quad (2)$$

And so how much fuel is consumed in the first 0.2 seconds?

$$\text{fuel consumed} = (7.625\,\text{gr}/\,\text{sec}) \times (0.2\,\text{sec}) = 1.525\,\text{gr}\,. \tag{3}$$

Hence, the fractional amount of fuel consumed in the first 0.2 seconds of flight is

$$\text{fractional amount of the fuel consumed} = \frac{1.525\,\text{gr}}{12.2\,\text{gr}} = 0.125\,. \tag{4}$$

To convert this to a percentage, we just multiply it by 100%,

$$\%\text{ of the fuel consumed} = 0.125 \times 100\% = 12.5\%\,. \tag{5}$$