4. Smoothies

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Recitation due Sep 15, 2021 20:30 IST

Smoothie 1

3/3 points (graded)

Suppose you have three smoothie powders, each with different grams of the nutrients A, B, C (e.g., protein).

One scoop of the first smoothie powder has 1g of A, 3g of B, and 1g of C.

One scoop of the second smoothie powder has 2g of A, 0g of B, and 2g of C.

And one scoop of the third smoothie powder has 1g of A, 1g of B, and 0g of C.

You wish to make a smoothie that will have 10 grams of each A, B, and C. Let x be the number of scoops of the 1st powder, y the number of scoops of the 2nd powder, and z the number of scoops of the 3rd powder. Set up a linear system with 3 equations whose solution would make the desired smoothie.

(The three answer boxes are graded together. This means that all boxes will be marked as incorrect if any one of them requires a change.)

(Enter an equation using notation such as `x+y+1=4*z`.)

x+2*y+z=10	✔ **Answer:** x + 2*y + z = 10
3*x+z=10	✔ **Answer:** 3*x + z = 10
x+2*y=10	✔ **Answer:** x + 2*y = 10

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Solution:

The equations are:

$$\begin{aligned} x &+ 2y + z &&= 10 \\ 3x &+ &z &= 10 \\ x &+ 2y &&= 10 \end{aligned}$$

For example, the first equation says that the total amount of nutrient A must equal 10.

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Answers are displayed within the problem

Smoothie 2

3/3 points (graded)

Now find the desired values of x, y, and z.

1. $x =$ 10/3 ✔ **Answer:** 10/3
2. $y =$ 10/3 ✔ **Answer:** 10/3
3.

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$z =$ 0 ✔ **Answer:** 0

Solution:

Solving the system from Smoothie 1, we obtain the answer $(x, y, z) = (10/3, 10/3, 0)$. It seems we don't need to buy the third powder after all!

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Answers are displayed within the problem

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