Lista de Exercícios
Z3
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1. Given a collection of integers, return the indices of any three elements which sum to zero. For instance, if you are given $[-1, 6, 8, 9, 10, -100, 78, 0, 1]$, you could return $\{0, 7, 8\}$ because $-1+1+0 = 0$. You can't use the same index twice, and if there is no match you should return $\{-1, -1, -1\}$.

   From `https://nathanleclaire.com/blog/2013/10/22/three-elements-that-sum-to-zero/`

2. Can you place all numbers from 1 to 16 into cells, such that the following 8 equations hold? Note that the operator "/" only works for non-remainder division, i.e. you can have 8/4 but not 8/3. As usual multiplication and division are performed before addition and subtraction.

A	+	B	/	C	=	D
+		-		-		+
E	/	F	+	G	=	H
*		*		/		/
I	+	J	+	K	=	L
=		=		=		=
M	-	N	/	O	=	P

   From `https://puzzling.stackexchange.com/questions/102658/4x4-grid-equations?noredirect=1`

3. If 100 bushels of corn were distributed among 100 people in such a manner that each man received three bushels, each woman two, and each child half a bushel, how many men, women, and children were there?

   If we add the condition that there are five times as many women as men. That way, the solution becomes unique (otherwise, there are seven solutions).

   From: `http://www.comp.nus.edu.sg/~henz/projects/puzzles/arith/index.html`

4. If you start with my age, in years, and apply the four operations:

   - $+2$
   - $/8$
   - -3
   - $*7$

   in some order, then the final answer you get is my husband's age in years. Funnily enough, if you start with his age and apply the same four operations in a different order, then you get my age. What are our two ages?

   From: `https://enigmaticcode.wordpress.com/2015/06/20/enigma-1224-age-changing/`

5. - Ten years from now Tim will be twice as old as Jane was when Mary was nine times as old as Tim.
   - Eight years ago, Mary was half as old as Jane will be, when Jane is one year older than Tim will be at the time, when Mary will be five times as old as Tim will be two years from now.
   - When Tim was one year old, Mary was three years older than Tim will be, when Jane is three times as old as Mary was six years before the time, when Jane was half as old as Tim will be, when Mary will be ten years older than Mary was, when Jane was one-third as old as Tim will be, when Mary will be three times as old as she was, when Jane was born.

   How old are the three persons now?

6. Harriet, upon returning from the mall, is happily describing her four shoe purchases to her friend Aurora. Aurora just loves the four different kinds of shoes that Harriet bought (ecru espadrilles, fuchsia flats, purple pumps, and suede sandals), but Harriet can't recall at which different store (Foot Farm, Heels in a Handcart, The Shoe Palace, or Tootsies) she got each pair. Can you help these two figure out the order in which Harriet bought each pair of shoes, and where she bought each?

   - Harriet bought fuchsia flats at Heels in a Handcart.
   - The store she visited just after buying her purple pumps was not Tootsies.
   - The Foot Farm was Harriet's second stop.
   - Two stops after leaving The Shoe Place, Harriet bought her suede sandals.

   Determine: Order - Shoes - Store

7. Each weekday, Bonnie takes care of five of the neighbors' children. The children's names are Keith, Libby, Margo, Nora, and Otto; last names are Fell, Gant, Hall, Ivey, and Jule. Each is a different number of years old, from two to six. Can you find each child's full name and age?

   - One child is named Libby Jule.
   - Keith is one year older than the Ivey child, who is one year older than Nora.
   - The Fell child is three years older than Margo.
   - Otto is twice as many years old as the Hall child.

   Determine: First name - Last name - Age

8. You have five bales of hay. For some reason, instead of being weighed individually, they were weighed in all possible combinations of two. The weights of each of these combinations were written down and arranged in numerical order, without keeping track of which weight matched which pair of bales. The weights, in kilograms, were 80, 82, 83, 84, 85, 86, 87, 88, 90, and 91.

   How much does each bale weigh? Is there a solution? Are there multiple possible solutions?

   From: `https://mathlesstraveled.com/2009/12/16/the-haybaler/`

9. In three dollars, you get 5 bananas, in five dollars, 7 oranges, in seven dollars, 9 mangoes and in nine dollars, three apples, I need to purchase 100 fruits in 100 dollars. Please keep in mind that all type of fruits need to be purchased but I do not like banana and apple, so these should be of minimum quantity.

10. A bookstore has a nice discount policy. If you buy a $20 book today, you get a 2% discount on your next purchase. If you buy a $15 book, you get a 1.5% discount on your next purchase. That is, for each $10 you spend you get 1% discount on your next purchase. If you have to buy three books that cost $10, $20 and $30, you could buy the $30 book today, the $10 book tomorrow (on which you'll get a 3% discount), and the $20 book the following day (on which you'll get a 1% discount). Or you could buy the $30 book and the $20 book today, and the $10 book tomorrow (with a 5% discount). What is the cheapest way to buy five books priced at $10, $20, $30, $40 and $50?