

## Example of A system for problem solving (UPIC method)

### Understand the problem

**1. Read the math problem once quickly to obtain an idea of its general nature.**

**Example:** Auntie Stella from Australia sends money to her niece, Alice, in USA on her birthday. She gives her \$10 on her first birthday and promises to sends her \$20 more than the birthday before on each birthday thereafter. How old will Alice be when she will receive a total of \$1,000 from Auntie Stella since she was born?

**2. Next read the problem carefully. Underline the relevant information or key words. Understand what facts and/or relationships do they have?**

**Example:** Auntie Stella from Australia sends money to her niece, Alice, in USA on her birthday. She gives her \$10 on her first birthday and promises to sends her \$20 more than the birthday before on each birthday thereafter. How old will Alice be when she will receive a total of \$1,000 from Auntie Stella since she was born?

**3. Ignore the irrelevant info. Organize or rephrase the important information.**

**Example:** She gives her \$10 on her first birthday and promises to sends her \$20 more than the birthday before on each birthday thereafter. How old will Alice be when she will receive a total of \$1,000 from Auntie Stella since she was born?

*What does it mean that Alice will get \$20 more than on the birthday before?* It means that the amount increases by \$20 every year. For birthday year 1, she gets \$10. On birthday year 2, she gets  $\$10 + \$20 = \$30$ . On birthday year 3, she gets  $\$30 + \$20 = \$50$ , and so on.

**4. Circle the question(s). It's very important to accurately understand what are being asked. Restate the question(s) if necessary. What do you know that is not stated in the problem?**

**Example:** She gives her \$10 on her first birthday and promises to sends her \$20 more than the birthday before on each birthday thereafter. How old will Alice be when she will receive a total of \$1,000 from Auntie Stella since she was born?

### Pick a strategy or method to solve the problem

**Example:** To solve this problem, beginner students would use "**Table**" strategy while advanced students might use "**sum of odds =  $n^2$** " formula.

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**I**mplement, Solve it, and Box the answer.

*Method 1: Using “Table” strategy:* Make a table to keep track of the amount given for each birthday and a running total for all the money Aunt Isabella sent. Continue the chart until the total amount you reach is \$1,000.

Birthday year:	Amount this year:	Total so far:
1	\$10	\$10
2	\$30	\$40
3	\$50	\$90
4	\$70	\$160
5	\$90	\$250
6	\$110	\$360
7	\$130	\$490
8	\$150	\$640
9	\$170	\$810
<b>10</b>	<b>\$190</b>	<b>\$1,000</b>

**Answer:** When Natalie turns 10 years old, she will have received a total of \$1,000.

*Method 2: Using “sum of odds =  $n^2$ ” formula:*

$$10 + 30 + 50 + 70 + \dots = 1000$$

$$10(1+3+5+7+\dots) = 1000$$

$$1+3+5+7+\dots = 100$$

$$n^2 = 100$$

$$n = 10$$

**Ans:** *10 years old*

**C**heck and verify the answer(s). Does your answer seem reasonable?

Getting a total of \$1000 in 10 years means an average of \$100 per year seems reasonable.