

36) understanding the problem - You have to find the pattern of the increasing toothpicks. Such as differences between the figures and how many toothpicks each figure has. Once you do this you need to figure out an algebraic equation. This equation should allow you to solve for the number of toothpicks in each figure. Once you figure out the equation you need to calculate the number of toothpicks in the 50th figure.

making a plan - First I need to calculate the differences between each figure. This should show me a pattern and allow me to figure out an algebraic equation. Once I do this I need to use the equation to solve for the 50th figure.

carrying out the plan -

(# 1) (# 2) (# 3) (# 4)

5 7 9 11

↓ ↓ ↓ ← arithmetic difference

The pattern is that one toothpick is added to the top of the figure and the other toothpick is added to the bottom of the figure. In turn adding two toothpicks each time.

The formula I came up with is...

$$a_n = 2n + 3 \quad \rightarrow \text{allow } n \text{ to represent}$$

the number of the figure. This will give you how many

for example : $a_n = 2n + 3$ } toothpicks are in each figure.

$2(1) + 3$ } first figure

$2 + 3$

5

50th figure $\rightarrow a_n = 2(50) + 3$

$100 + 3$

103

There would be 103 toothpicks in the 50th figure.

looking back - The formula fits the pattern for the increasing number of toothpicks. It works for all of the figures that I calculated it with. I checked the number of toothpicks in the 50th figure through simple addition as well.

The equation of the line is $y = -3x + 0$ or $y = -3x$.