

Solution to Problem Solving #1

A)
Figure

$\frac{1}{1}$

$\frac{1}{2}$

$\frac{1}{3}$

+2

+2

+2

...

3

+

5

+

7

+

.....

+67

+69

$$72 + 72 + \dots + 72 = 1224$$

Solution to Problem Solving #1

B Given toothpick figures: $\triangle$ $\triangle \nabla$ $\triangle \nabla \triangle$

figure #:	1	2	3
# of toothpicks	3	5	7

Seem to add 2 toothpicks when moving from one figure to the next.

Note we want to find
 (# of toothpicks in all the figures up to the last one which has 69 toothpicks)

$$= 3 + 5 + 7 + \dots + 69$$

idea that
 $x + y = y + x$

We could add these up directly or use commutativity to change the order a bit.

$$(3 + 5 + 7 + \dots + 67) + 69$$

$$= (3 + 69) + (5 + 67) + \dots + (35 + 37)$$

the last figure number would be n where
 $1 + 2n = 69$
 or $2n = 68$
 or $n = 34$
 So there are 34 figures

$$= 72 + 72 + \dots + 72$$

= there are 17 or $\frac{1}{2}(34) = \frac{1}{2}(\# \text{ of figures})$

$$= 17 \cdot 72$$

17 18
 34 36

$$= 1224 \text{ toothpicks}$$