

→ 65 → 61 → 37
37 Repeats!

CW

1. Happy Numbers:

PROCEDURE:

- 1) Square each DIGIT separately
- 2) Add the results
- 3) Repeat , Keep repeating

RULE:

- If you end up with a final sum of ONE, the number is happy 😊
- If the sum never reaches one, but instead cycles back to a previous sum, this will be an infinite loop and the number is UNHAPPY ☹️

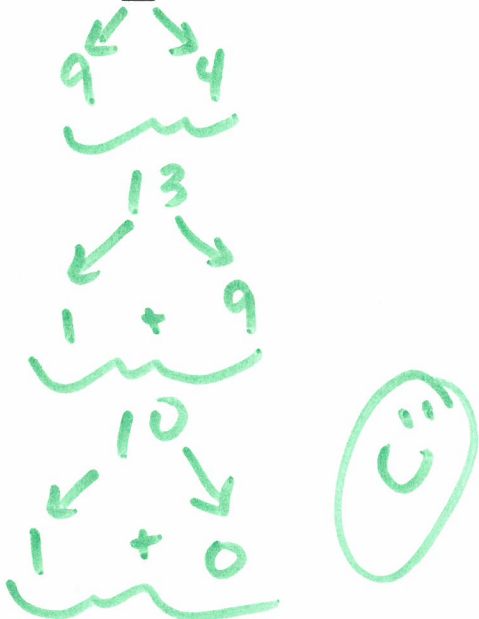
EXAMPLE:

Hmmm.... Let's try the number 4:

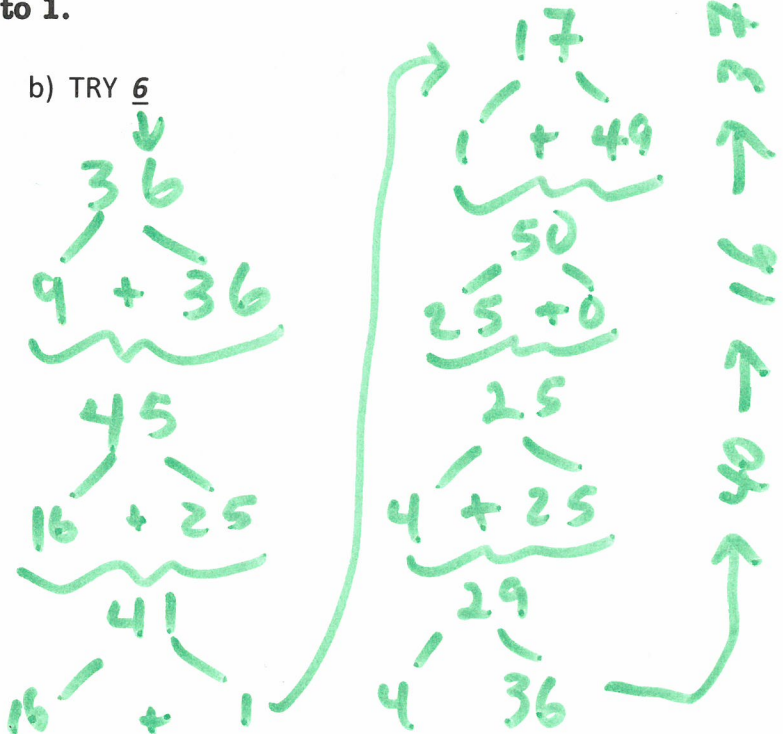
- 4 ←
- $4^2 = 16$ square both the 1 and the 6, then add them
- $1^2 + 6^2 = 1 + 36 = 37$ square both the 3 and the 7, then add them etc.
- $3^2 + 7^2 = 9 + 49 = 58$
- $5^2 + 8^2 = 25 + 64 = 89$
- $8^2 + 9^2 = 64 + 81 = 145$
- $1^2 + 4^2 + 5^2 = 1 + 16 + 25 = 42$
- $4^2 + 2^2 = 16 + 4 = 20$
- $2^2 + 0^2 = 4 + 0 = 4$ ☹️

No, the number 4 is UNhappy. It never got to 1 ☹️ ... it only got back to 4, which would go on forever, so it will never get to 1.

a) TRY 32



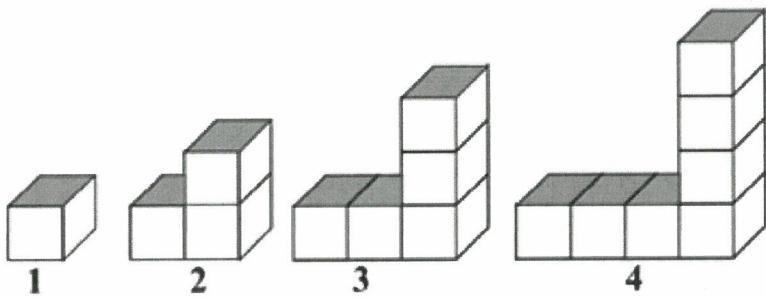
b) TRY 6



81 → 76 → 42 → 18
145 → 89 → 58 → 85 → 42
89 → 145 → 42 → 18
40 → 16 → 37 → 58 → 89 → 145 → 42 → 18

2. Patterns

a) Build or draw the fourth figure in this series



What would "Figure # Zero" look like? Draw it here:

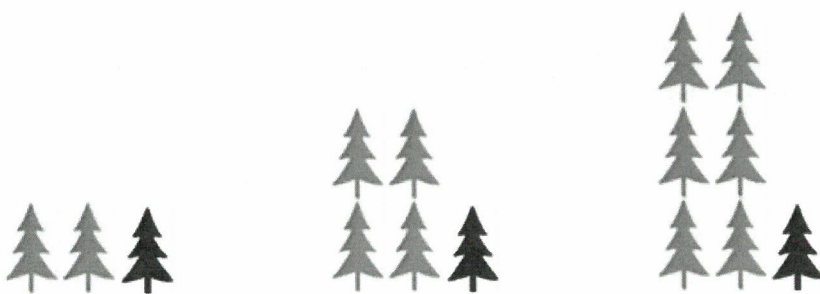


Can you fill in the blanks?

	Figure 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5	LEVEL 2: The 10 th fig.?	LEVEL 3: The 43rd fig.?
Number of squares	1	3	5	7	9	19	85

Fig zero would be -1!
 $-1 + 10 \times 2$
 $43 \times 2 - 1$

b) Draw the fourth figure in this series:



What would "Figure # Zero" look like? Draw it here:

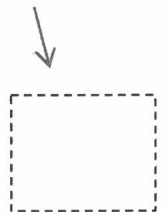


Figure 1

Fig. 2

Fig. 3

Can you fill in the blanks?

	Figure 1	Fig. 2	Fig. 3	Fig. 4	Fig. 5	LEVEL 2: The 10 th fig.?	LEVEL 3: The 43rd fig.?
Number of ^{tree} squares	3	5	7	9	11	21	87

Fig zero is 1
 $1 + 10 \times 2$ $1 + 43 \times 2$