Aufgabe 3:

$$f(n) = \frac{\phi^n - \hat{\phi}^n}{\sqrt{5}}$$

IA $n = 1$

$f(1) = 1$ $\quad \frac{\phi^1 - \hat{\phi}^1}{\sqrt{5}} = \frac{\sqrt{5}}{\sqrt{5}} = 1$ $\quad \checkmark$

IA $n = 2$

$\qquad\qquad \rightarrow \phi^2 = \phi + 1$

$f(2 = 1$ $\quad \hookrightarrow \frac{(\phi + 1) - (\phi + 1)}{\sqrt{5}} = \frac{\phi^2 - \phi^1}{\sqrt{5}} = 1$ $\quad \checkmark$
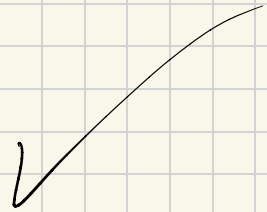
$$f(n+1) = f(n) + f(n-1)$$

$$f(n+1) = \frac{\emptyset^n - \hat{\emptyset}^n}{\sqrt{5}} + \frac{\emptyset^{n-1} - \hat{\emptyset}^{n-1}}{\sqrt{5}}$$

$$\hookrightarrow \emptyset^{n+1} = \emptyset^n + \emptyset^{n-1} \qquad \emptyset^2 = \emptyset + 1$$

$$\hookrightarrow \emptyset^{n+1} = \emptyset^n + \hat{\emptyset}^{n-1}$$

$$f(n+1) = \frac{\emptyset^{n+1} - \hat{\emptyset}^{n+1}}{\sqrt{5}} \qquad \checkmark$$

Warum $T_{(n)} = \Theta(\emptyset^n)$

Da in funktion 2 mal die Funktion erneut aufgerufen werden