



## Linearization of powers of the golden ratio

Assume  $n$  is a positive integer and  $F_0 = 0$ .

(a) Using  $\Phi^2 = \Phi + 1$ , prove by mathematical induction the following linearization of powers of the golden ratio:

$$\Phi^n = F_n \Phi + F_{n-1}.$$

(b) Using  $\phi^2 = -\phi + 1$ , prove by mathematical induction the following linearization of powers of the golden ratio conjugate:

$$(-\phi)^n = -F_n \phi + F_{n-1}.$$

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*There are two ways you can submit your answer to this prompt:*

**1) Easier option:** You can write up the proof on a piece of paper, take a picture or scan it, and then post it as your reply by clicking on the Camera or Picture icon. Make sure the proof is legible so others can comment on it.

**2) Advanced option:** You can type in your answer using Mathjax input. Read more here - [Mathjax Basic Tutorial](#).

**Important Notes:** Coursera requires you to use double \$\$ at the start and end of each expression (single \$ does not work). HKUST cannot support any technical problems encountered with Mathjax input in Coursera.

Participation is optional



Type your response here...

IP



2 learners have submitted a response.

