More recommended problems:

Sample FM (DM) #11, #15, #17, #26.
Problem 4.3. Farmer Shaun is producing sweet potatoes. He intends to harvest 10,000–cartons’ worth in six months. His total costs are $12.00 per carton.

He wishes to hedge using European put options. There are two puts on sweet potatoes with the exercise date in six months available: one with the strike price of $13 per carton and another with the strike price of $15 per carton. Their premiums are $0.15 and $0.18, respectively.

Assume that the prevailing risk-free interest rate is 4% effective for the half-year period.

At harvest time, in six months, it turns out that the sweet-potato spot price equals $14. What would Farmer Shaun’s profit be if he had decided to hedge using the $13-strike put versus his profit if he had decided to use the $15-strike put to hedge?

\[
\begin{align*}
\text{Producer who hedges \( w \) put:} \\
\text{Payoff (Hedged)} &= \text{Payoff (Unhedged)} + \text{Payoff (Long Put)} \\
S(T) \ldots \text{final asset price} \\
&= \left\{ \begin{array}{ll}
K, & K > S(T) \\
S(T), & K < S(T)
\end{array} \right.
\end{align*}
\]

\[
\underbrace{\text{sale of the produced good}} \Rightarrow \text{Farmer gets a guaranteed minimal sale price for the good.}
\]

\[
\text{Payoff} = \max(K, S(T))
\]
Hedged = Unhedged + the hedge

= Long in underlying + Long Put

\[
\text{Payoff (FLOOR)} = \text{Payoff (underlying)} + \\
\quad + \text{Payoff (Long Put)}
\]

= \( S(T) + (K - S(T))^+ \)

\[
= \begin{cases} 
  K & \text{if } S(T) \leq K \\
  S(T) & \text{if } S(T) > K
\end{cases}
\]

= \( \max(K, S(T)) \)

The guarantee of the minimal sale price for the underlying.

Happy Jalapeños, LLC has an exclusive contract to supply jalapeño peppers to the organizers of the annual jalapeño eating contest. The contract states that the contest organizers will take delivery of 10,000 jalapeños in one year at the market price. It will cost Happy Jalapeños 1,000 to provide 10,000 jalapeños and today’s market price is 0.12 for one jalapeño. The continuously compounded risk-free interest rate is 6%.

Happy Jalapeños has decided to hedge as follows (both options are one year, European):

\[
\begin{align*}
(1) \text{ buy } 10,000 \text{ 0.12-strike put options for 84.30, and} \\
(2) \text{ sell } 10,000 \text{ 0.14-strike call options for 74.80.}
\end{align*}
\]

Happy Jalapeños believes the market price in one year will be somewhere between 0.10 and 0.15 per pepper. Which interval represents the range of possible profit one year from now for Happy Jalapeños?

A. 200 to 100  
B. 110 to 190  
C. 100 to 200  
D. 190 to 390  
E. 200 to 400

The collar is a **short** position w/ respect to the underlying. If \( K_p = K_c \), we say it's a **zero-width collar**.