Problem 4.1. (2 points) An investor buys 10 shares of stock which pays a continuous dividend with the dividend yield equal to 0.05. Assume continuous and immediate reinvestment of dividend into the same asset. How many shares does the investor own 2 years from the original purchase?

Problem 4.2. (2 points) An investor buys \( n_0 \) shares of continuous-dividend-paying stock with the aim of owning exactly 10 shares three later. Assume that the dividend yield is equal to 0.02. Assume continuous and immediate reinvestment of dividend into the same asset. Calculate \( n_0 \).
SHORT SALES

Assume temporarily non-dividend-paying asset:

Cashflow:

At $t=0$:
the borrowed share is sold @ the market price $S(0)$, i.e., the short-seller gets $S(0)$.

At $t=T$:
the short-seller buys the share back for $S(T)$ and returns it to the original owner.

Reasons:
→ Speculation (in the hope the asset price drops sufficiently).
→ Financing strategy (w/ an uncertain interest rate).
Credit Risk $\Rightarrow$ MARGIN ACCOUNT

At $t=0$, the short-seller deposits an amount into a "savings account". (credits interest)

Typically the initial deposit is a percentage of the initial value of the borrowed stock.

Reintroduce dividends

- Discrete
  - Deduced from the margin account when needed.
- Continuous

Cashflow: $+S(0)$

For the short-seller

1 share borrowed $\Rightarrow$ return $1 \cdot e^{\delta T}$ shares

$-S(0)T \cdot e^{\delta T}$
Q: What happens w/ \( S(0) @ t=0 \)?

\[ \text{BROKER} \]
\( \text{(not even invested)} \)
\( \text{@ the risk-free interest rate} \)

\[ \text{SHORT-SELLER} \]
\( \text{(invest) the money as they want:} \)
\( \text{e.g., * admire the money;} \)
\( \text{* savings acct;} \)
\( \text{* invest in other assets...} \)
Example:
You sell a stock short for a price of $1000. The broker keeps 3%.

The margin requirement is 60% of the selling price. The interest on the margin account is credited at an effective annual rate of 6%.

You close the short-sale in one year. At that time, the price of stock is $900 per share.

Just prior to closing, the stock paid a dividend of \( \times \).

You earned an effective annual yield rate of 20%. \( X = ? \)