Name:

1. (25 points) Consider the D-type flip flop below. Draw the waveform for the output $Q_{OUT}$ to the input $D_{IN}$. Hint: start by drawing dotted lines at each rising clock edge.

![D-type flip flop diagram](image)

CLK

D$_{IN}$

$Q_{OUT}$

2. (25 points) Consider the D-type flip flop below with an inverter feeding $Q_{OUT}$ back to $D_{IN}$. The initial state of $Q_{OUT}$ is 0, causing $D_{IN}$ to be driven to 1. Draw the waveform for the output $Q_{OUT}$ and $D_{IN}$.

![D-type flip flop with inverter diagram](image)

CLK

D$_{IN}$

$Q_{OUT}$