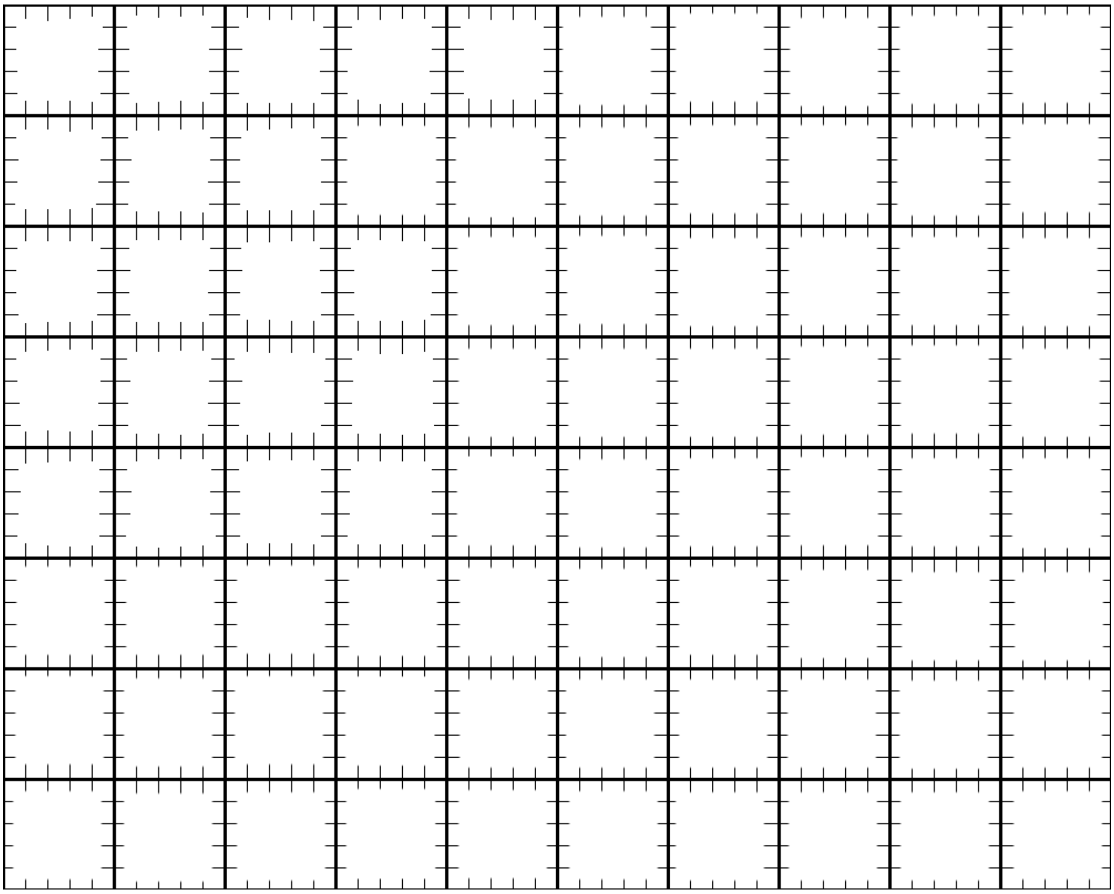
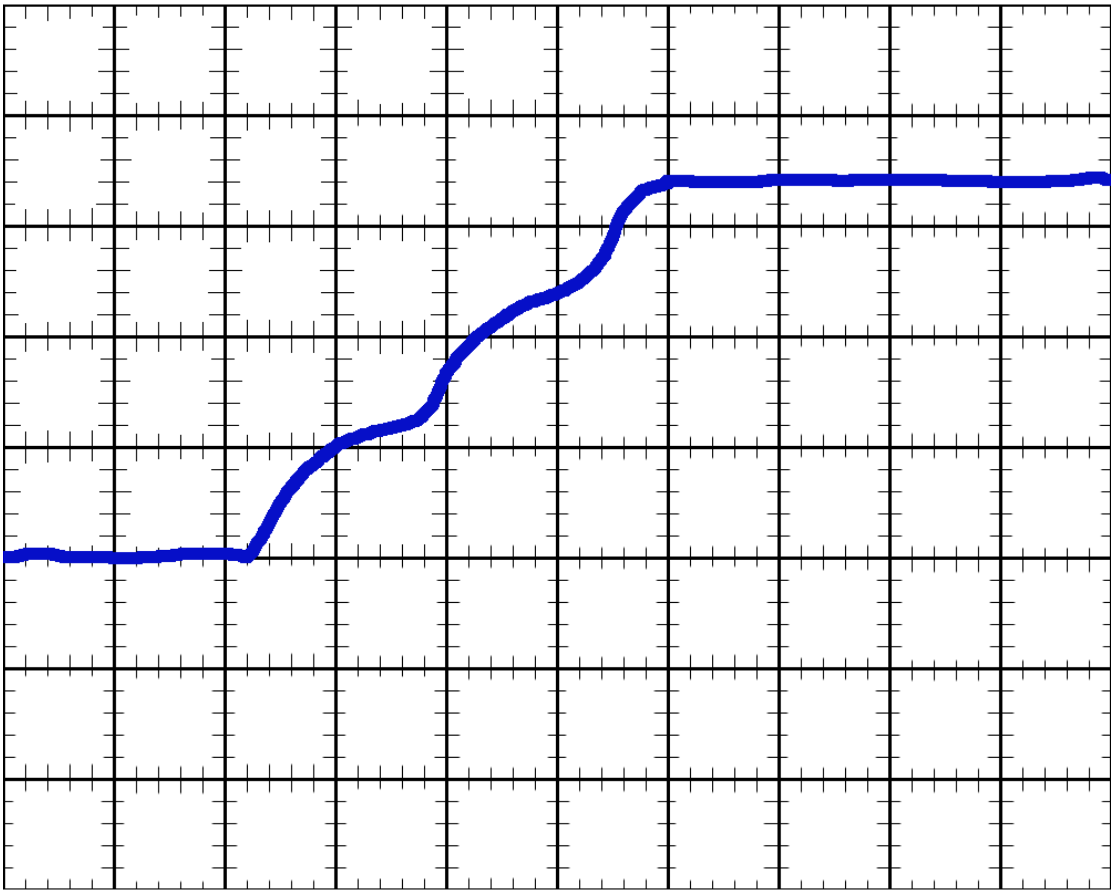
Here is a scope



10 big divisions across the bottom (each one split into 5 sub-divisions)
8 big divisions up the side (each one split into 5 sub-divisions)

Say horizontal scale set such that it is 1us/div: total time across screen is 10us and each sub-division is 200ns.

Say vertical scale set such that it is 1V/div: total vertical voltage is 8V and each sub-division is 200mV.



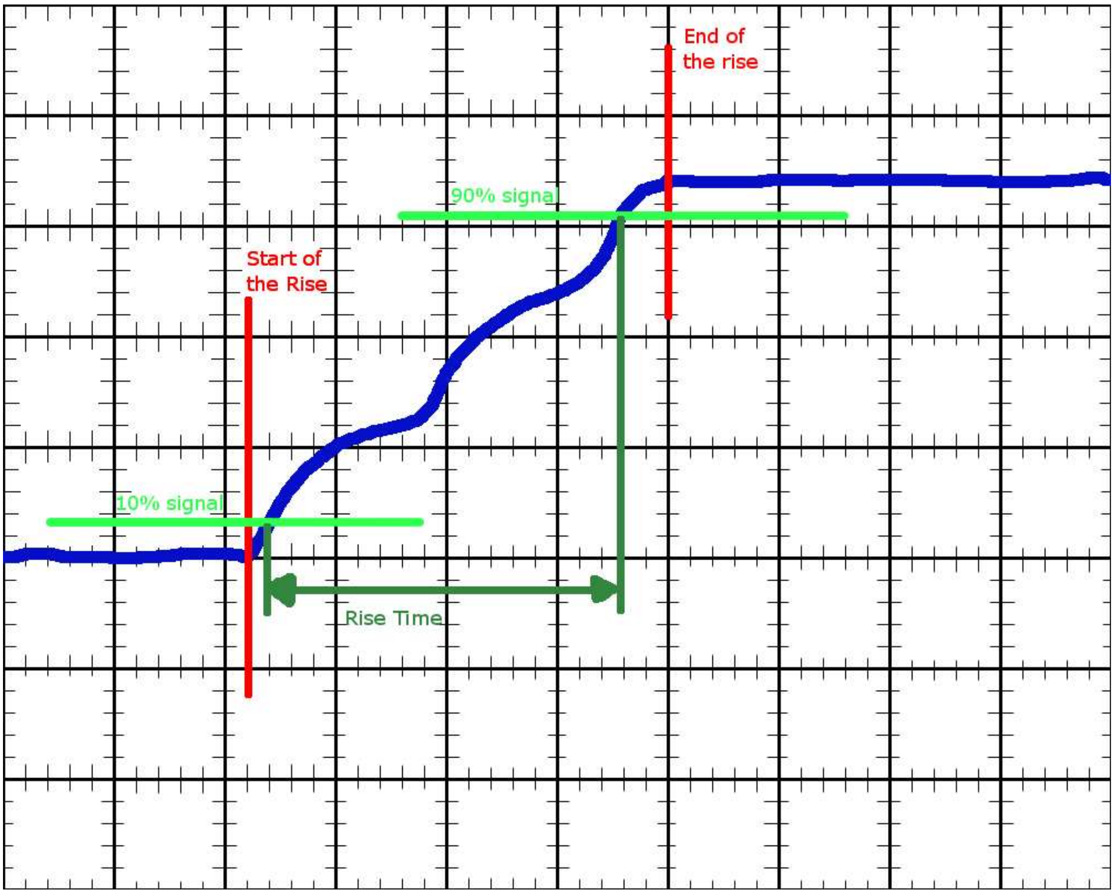
Take this rising signal:
The minimum signal amplitude is 0V (approx) and the maximum is 3.4V
Thus 0% of the signal strength is 0V
10% of the signal is 0.34V
20% of the signal is 0.68V
…
80% of the signal is 2.72V
90% of the signal is 3.06V
100% of the signal is 3.4V.

It starts off at approx 0V and at time 2.1us (from the left-hand edge) it starts to change.

Between times: 0s and 2.2us the signal amplitude is 0% of the maximum.
Between times 6us and 8us the signal amplitude is 100% of the maximum.

Thus the rise time for a 0%-100% definition would be: 6us – 2.2us = 3.8us

Now the standard definition of rise time is to state the time it takes for a signal to rise from 10% of its maximum to 90% of its maximum. Equally fall-time is stated as the time it takes for a signal to fall from 90% of its maximum to 10% of its maximum.



Now the same waveform has a couple of “guide” drawn on it this time.

From the:

Thus 0% of the signal strength is 0V
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…
80% of the signal is 2.72V
90% of the signal is 3.06V
100% of the signal is 3.4V.

We can see where 10% signal is and equally where 90% signal is (the light-green depicts those voltage levels)

Now that particular voltage corresponds to a time:

Ie at time= 2.4us the signal is at 10% of its maximum amplitude
At time = 5.6us the signal is at 90% of its maximum amplitude.
Thus the rise time is: 5.6us – 2.4us = 3.2us