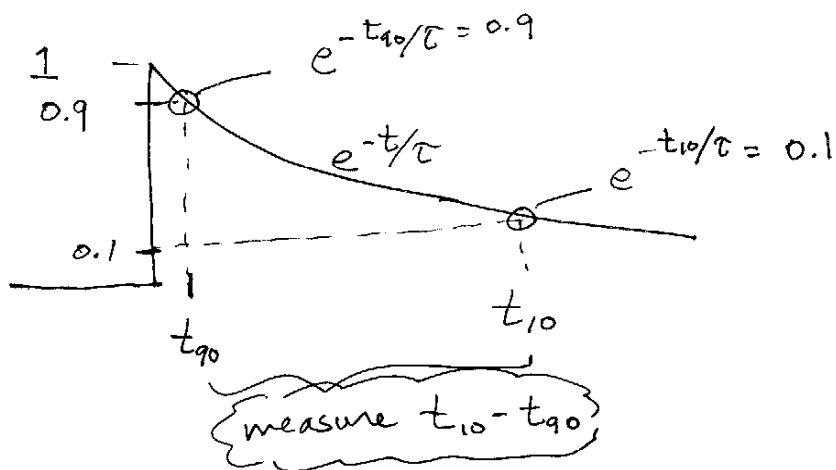


|| Measuring time constant using 10% - 90%  
lines on oscilloscope: ||



\* Solve for  $\tau$  in terms of  $t_{10} - t_{90}$ :

$$-\frac{t_{90}}{\tau} = \ln 0.9 \quad ; \quad t_{90}$$

$$-t_{90} = \tau \ln 0.9$$

$$+ \quad +t_{10} = -\tau \ln 0.1$$

$$t_{10} - t_{90} = \tau (\ln 0.9 - \ln 0.1)$$

$$\tau = \frac{t_{10} - t_{90}}{\ln 0.9 - \ln 0.1} = \frac{t_{10} - t_{90}}{\ln \left( \frac{0.9}{0.1} \right)}$$

$$\tau = \frac{t_{10} - t_{90}}{\ln 9}$$