IV. Irreversible "nth"-Order Reaction:

A. Given:

$$nA \xrightarrow{k} P$$

B. Rate Equation:

$$-d[A]/dt = k[A]^n = nd[P]/dt$$

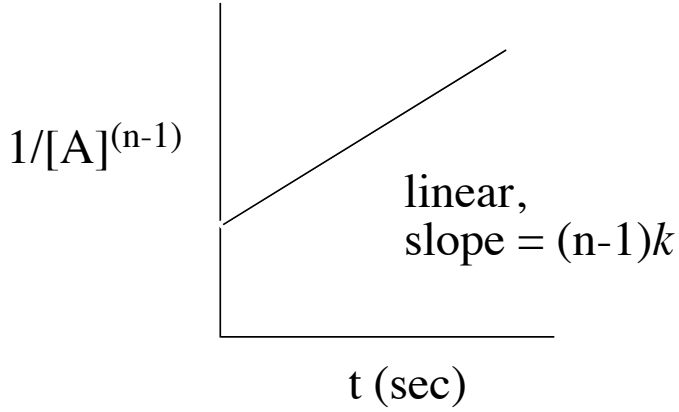
- $k = nk$ if you wish to keep track of stoichiometry.
- If $n < 1$ or $n > 2$, a complex, multi-step mechanism is implicated.

Integrate... (CRC #7, $n \neq 1$)

$$1/[A]^{(n-1)} - 1/[A_0]^{(n-1)} = (n-1)kt$$

IV. Irreversible "nth"-Order Reaction:

C. Graphics:



• Cross-check: If n = 2, the rate equation reduces to the second-order expression.

• As an illustration, n = 1/4 affords linearity in a plot of $[A]^{0.75}$ vs. t (or $[A]^{0.75} - [A_0]^{0.75}$ vs. t).

• There are ways other than looking for linearities to determine the order in the limiting reagent (see Section VI below).