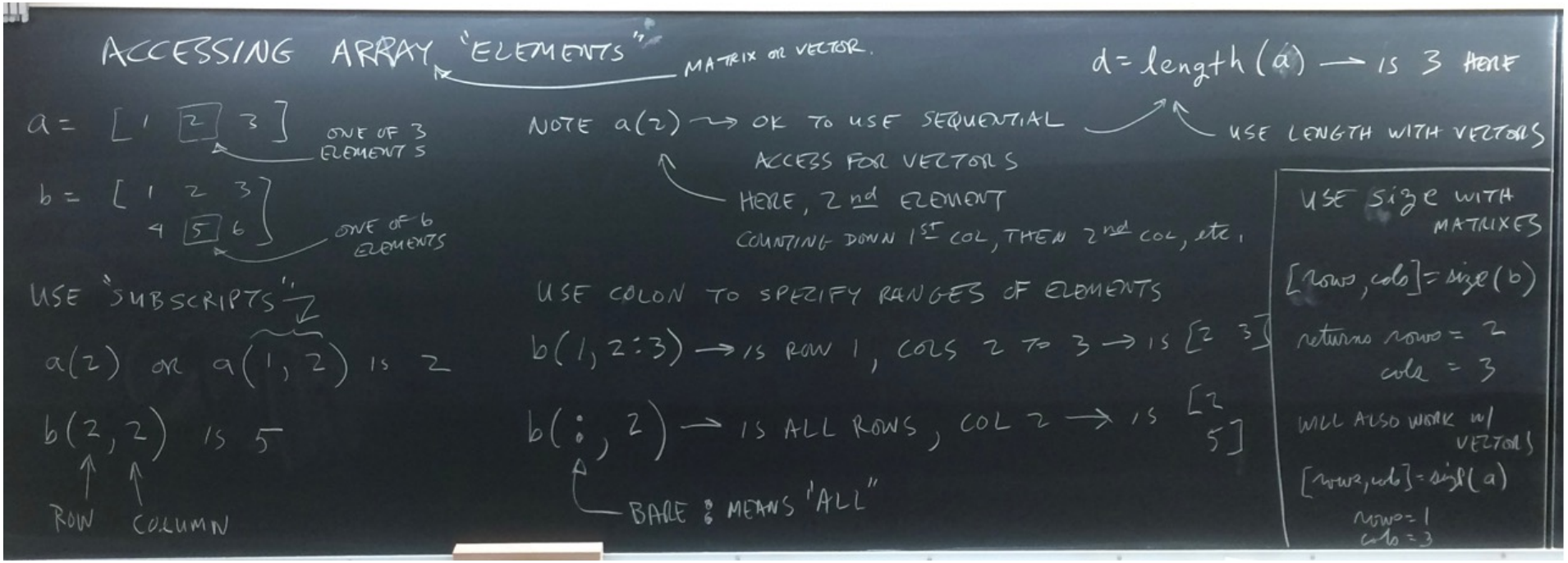
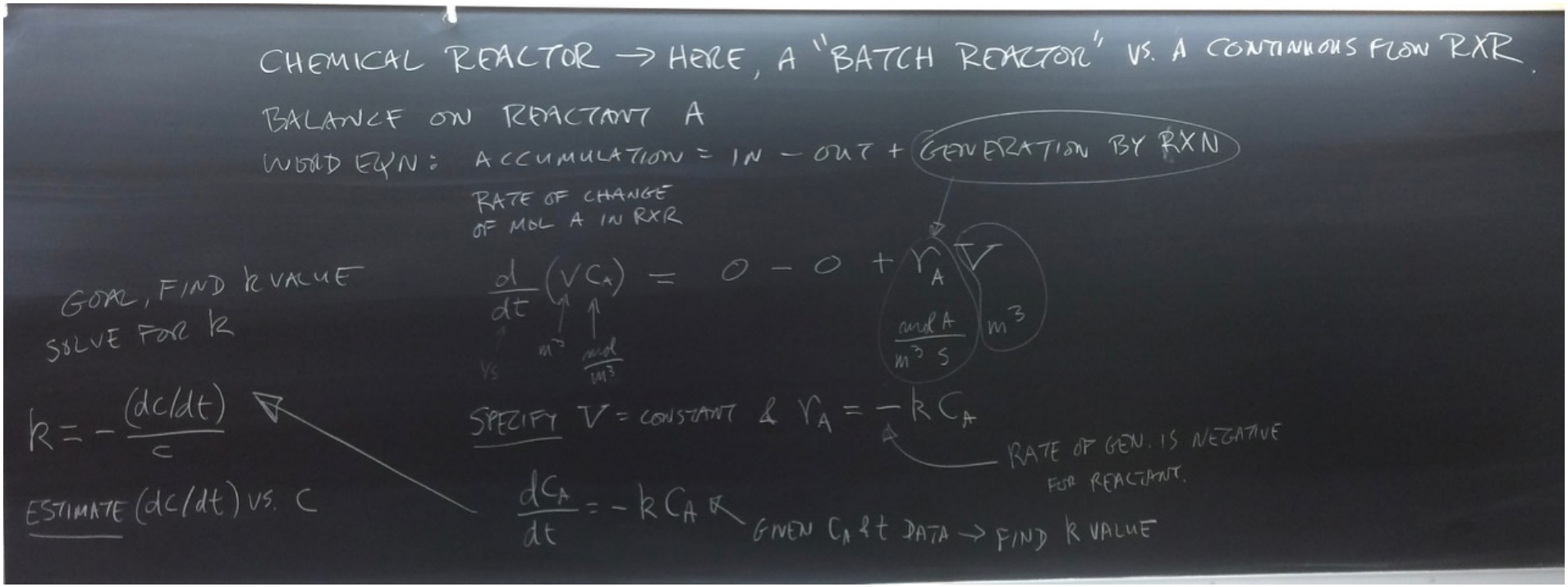

ACCESSING ARRAY "ELEMENTS"
MATRIX OR VECTOR.
d = length(a) → IS 3 HERE
a = [1 2 3]
ONE OF 3 ELEMENTS
NOTE a(2) → OK TO USE SEQUENTIAL ACCESS FOR VECTORS
HERE, 2nd ELEMENT
COUNTING DOWN 1ST COL, THEN 2ND COL, etc.
USE LENGTH WITH VECTORS
b = [1 2 3
4 5 6]
ONE OF 6 ELEMENTS
USE "SUBSCRIPTS"
a(2) OR a(1, 2) IS 2
b(2, 2) IS 5
ROW
COLUMN
USE COLON TO SPECIFY RANGES OF ELEMENTS
b(1, 2:3) → IS ROW 1, COLS 2 TO 3 → IS [2 3]
b(:, 2) → IS ALL ROWS, COL 2 → IS [2 5]
BARE : MEANS "ALL"
USE size WITH MATRIXES
[rows, cols] = size(b)
returns rows = 2
cols = 3
WILL ALSO WORK W/ VECTORS
[rows, cols] = size(a)
rows = 1
cols = 3


CHEMICAL REACTOR → HERE, A "BATCH REACTOR" VS. A CONTINUOUS FLOW RXR.
BALANCE ON REACTANT A
WORD EQN: ACCUMULATION = IN − OUT + GENERATION BY RXN
RATE OF CHANGE OF MOL A IN RXR
$\frac{d}{dt}(VC_A) = 0 - 0 + r_A V$
$\frac{mol\ A}{m^3\ s}$ m^3
V m^3 $\frac{mol}{m^3}$ s
GOAL, FIND k VALUE
SOLVE FOR k
$k = -\frac{(dc/dt)}{c}$
ESTIMATE (dc/dt) VS. C
SPECIFY V = CONSTANT & $r_A = -kC_A$
RATE OF GEN. IS NEGATIVE FOR REACTANT.
$\frac{dC_A}{dt} = -kC_A$
GIVEN C_A & t DATA → FIND k VALUE

COPY & PASTE DATA INTO MATLAB

COMMENT-OUT HEADER INFO → SET Comment % BUTTON IN EDITOR TAB

```
% ____
% ____
d = [
    #  #  #  #
    ];

% EXTRACT CA
c = d(:,3);
plot(c)  % SEE IF LOOKS REASONABLE
```

```
% GENERATE t VECTOR.
t = 0:30:30*(length(c)-1);
plot(t,c)
```

TO GET ΔC → USE BUILT-IN FUNCTION diff

$c = [50 \quad 46 \quad 44 \quad 42]$

$dc = diff(c)$ % $dc = [-4 \quad -2 \quad -2]$ → EACH ELEMENT $c(i+1) - c(i)$ FOR ANY i

HERE, $44 - 46 = -2$

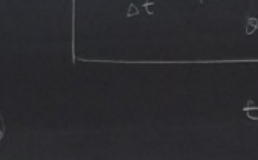
% NOTE dc HAS 1 FEWER ELEMENTS THAN c

$dt = diff(t)$ OR $dt = 30$

$k = -(dc/30)$ ./ c ← GET ERROR, DIFF. SIZE OF dc & c

→ OPTIONS → $cp = c(2:length(c))$

OR $cp = c(1:length(c)-1)$



c
50
45
36

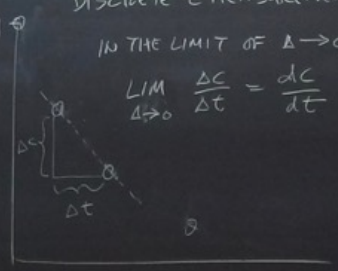
$length(c) = 3$

$t = 0:30:30*(length(c)-1)$

DISCRETE c MEASUREMENTS

IN THE LIMIT OF $\Delta \to 0$

$\lim_{\Delta \to 0} \frac{\Delta c}{\Delta t} = \frac{dc}{dt}$



CONTINUOUS c IN REALITY