

Place **ANSWERS ONLY** in the box

Class Time \_\_\_\_\_

1. Given the following transition matrix;

$$\begin{array}{c}
 A \\
 B \\
 C \\
 D \\
 E
 \end{array}
 \begin{bmatrix}
 A & B & C & D & E \\
 0 & .1 & .2 & .3 & .4 \\
 0 & 1 & 0 & 0 & 0 \\
 .3 & .2 & 0 & .1 & .4 \\
 .5 & .3 & .2 & 0 & 0 \\
 0 & 0 & 0 & 0 & 1
 \end{bmatrix}$$

a. Subdivide given matrix into absorbing and nonabsorbing states:

b. Which state(s) are absorbing?

c. Obtain Fundamental Matrix T and product TS, label rows and columns

T=

TS =


d) If we start in state C, for how many steps should we expect to be in state A?  
(4 decimal places)
3) If we start in state D, how many steps should we expect before absorption?  
(4 decimal places)
4) If we start in state D, Find the probability that we are eventually absorbed into state B.  
(4 decimal places)

2. Chris wants to buy Pat a used scooter that was in the paper. The scooter is \$400. Every day, Chris will bet \$100 until either getting to \$400 or going broke. For each bet, the probability of winning is 45% (no ties).

a. Find the transition matrix of that Markov chain and write it below **subdivided** into absorbing and nonabsorbing states: (label states: \$0, \$100, \$200, \$300 and \$400, place absorbing states first)

b. List absorbing states

c. Obtain Fundamental Matrix T and product TS, label rows and columns.

T=

TS =

d) If Chris starts with \$100, how many times will he have \$200?  
(4 decimal places)

e) If Chris starts with \$200, how many times will he play before being absorbed  
(winning \$400 or losing it all) (4 decimal places)

f) If Chris starts with \$100, find the probability of getting to \$400.  
(4 decimal places)