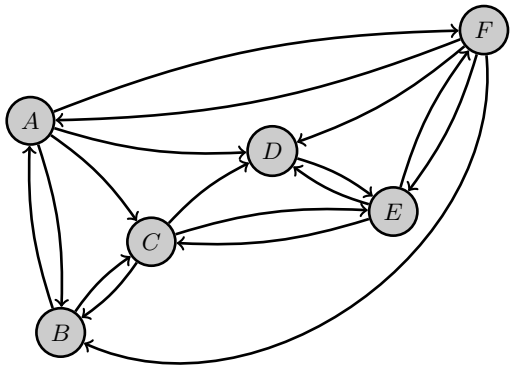
Math 100—Homework 07

Due: Friday May 03

Name _____

Directions: please print this page, and put your solutions in the space provided.
If you need extra space, you can attach another sheet of paper.

1. Consider the following network of webpages below. Each node represents a webpage, and each arrow represents a link from one page to another.



(a) Find the transition matrix T.

(b) Find an eigenvector for T associated to the eigenvalue $\lambda = 1$. (See the back of this sheet for help using WolframAlpha.)

(c) Use your answer from the previous part to find the steady-state vector for T. *Please show your work.*

(d) Find the (approximate) probability of ending up on each page after infinitely-many random clicks.

A _____	B _____	C _____	D _____	E _____	F _____

(e) Determine the page ranking. (#1 is the most important.)

#1 _____	#2 _____	#3 _____	#4 _____	#5 _____	#6 _____

Using WolframAlpha to find eigenstuff.

Suppose you want to analyze the following matrix.

$$A = \begin{bmatrix} \frac{1}{3} & \frac{1}{6} & \frac{1}{2} \\ 0 & \frac{1}{3} & \frac{1}{2} \\ \frac{2}{3} & \frac{1}{2} & 0 \end{bmatrix}$$

(a) Go to https://www.wolframalpha.com.

(b) If you want the characteristic polynomial of A, you would enter the following:

```
characteristic polynomial {{1/3,1/6,1/2},{0,1/3,1/2},{2/3,1/2,0}}
```

(c) If you want the eigenvalues of A, you would enter the following:

```
eigenvalues {{1/3,1/6,1/2},{0,1/3,1/2},{2/3,1/2,0}}
```

(d) If you want eigenvectors that correspond to the eigenvalues, you would enter the following:

```
eigenvectors {{1/3,1/6,1/2},{0,1/3,1/2},{2/3,1/2,0}}
```

Your result would be a list of vectors, and then below them, it would say which eigenvalue each vector is associated to.

(e) You can also try to diagonalize A using the following command:

```
diagonalize {{1/3,1/6,1/2},{0,1/3,1/2},{2/3,1/2,0}}
```

(f) Let me know if you have any questions!