Midterm 3

$(\ensuremath{\underline{1}})$ This is a preview of the published version of the quiz

Started: Nov 24 at 2:58pm

Quiz Instructions

Once you open this quiz, you will have 75 minutes to submit it. You will have only **one** submission attempt. The quiz must be **submitted** by 7:59 PM (Atlanta time) on Friday, November 20. There are 20 questions after the honor code pledge.

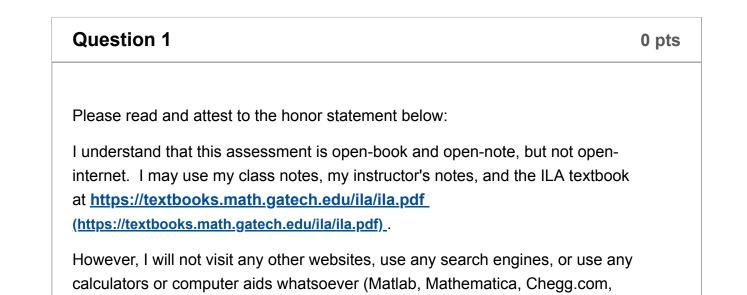
This assessment is open-book and open-note, but not open-internet. You may use your class notes, your instructor's notes, and the ILA textbook at <u>https://textbooks.math.gatech.edu/ila/ila.pdf</u> (<u>https://textbooks.math.gatech.edu/ila/ila.pdf</u>).

However, you may not visit any other websites, use any search engines, or use any calculators or computer aids whatsoever (Interactive Row Reducer, Matlab, Mathematica, Chegg.com, Geogebra, etc.) as you take this assessment.

Recently, Canvas has had issues displaying math equations. If this happens, you should try reloading (before you start!), switching browsers (again, before you start), and/or turning off ad blockers. If none of these work, you can still figure out what is supposed to be displayed. For instance,

Latex: $\left(\frac{1 & 2 \\ 3 & 4 \\ end{array}\right)$ is the 2 x 2 matrix with 1 2 on the top row and 3 4 on the bottom.

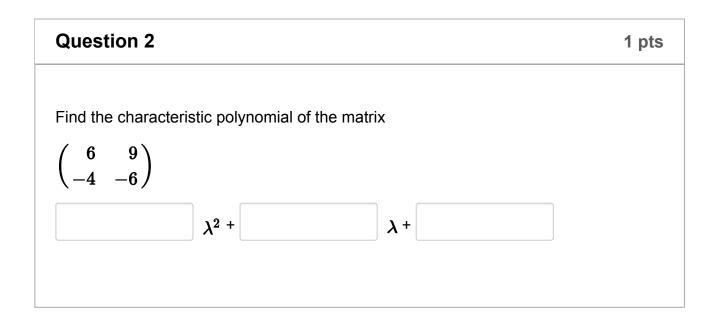
If it becomes necessary, make a good faith effort to interpret the code as above. If you feel that these technical issues are hindering your ability to take the exam, you should let your instructor know.

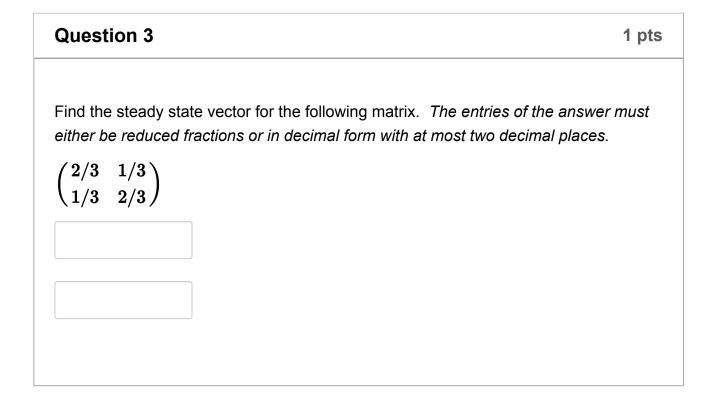


Geogebra, etc.) as I take this assessment.

This assessment is completely my own work. I will not discuss the answers or any of the contents of this assessment with anyone until the time it is due.

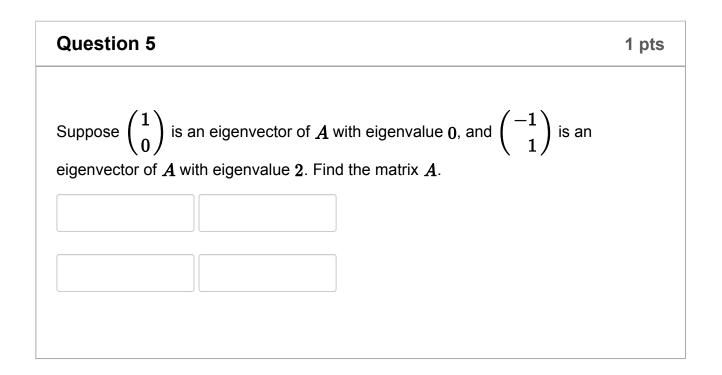
I attest to my integrity, and I understand that any suspected violation of this policy may be prosecuted to the fullest extent allowable by Georgia Tech.





Question 4 1 pts
Suppose *A* is a 2 × 2 matrix whose determinant is 1/2 and whose cofactor matrix equals

$$\begin{pmatrix} 1 & -1 \\ 2 & 1 \end{pmatrix}$$
.
Solve $Ax = \begin{pmatrix} 1 \\ 0 \end{pmatrix}$.



Question 6	1 pts

Find the value of $m k$ so that all eigenvalues of the matrix $egin{pmatrix} m s & k \ 2 & -1 \end{pmatrix}$ are real, but the
matrix is not diagonalizable.

Question 7			1 pts
Let $T: \mathbb{R}^2 o \mathbb{R}^2$ be the line	ear transformation defi	ned by	
Enter below one of the eigen	values for the standar	d matrix for T .	
One eigenvalue is	+	i	

Question 81 ptsSuppose that the determinant of
$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}$$
is 1. Find the determinant of $\begin{pmatrix} 3c-2a & 3d-2b \\ 2a & 2b \end{pmatrix}$.

Question 9	1 pts
What is the area of the triangle in \mathbb{R}^2 with vertices $(1,2)$, $(3,6)$, and $(3,5)$?	

Question 10	1 pts
Find the value of $m k$ so that the following matrix has determinant 8.	
$egin{pmatrix} 2 & 4 & 4 \ 0 & 3 & k \ -1 & k & -1 \end{pmatrix}$	
$\begin{pmatrix} -1 & k & -1 \end{pmatrix}$	

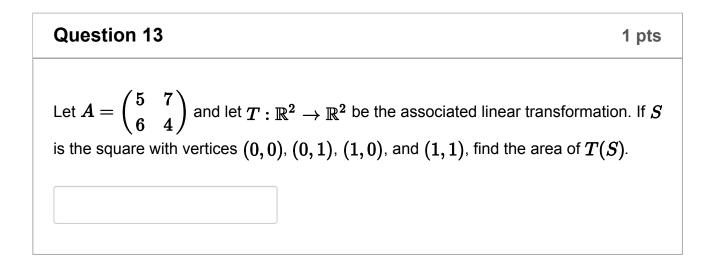
Question 11	1 pts
Let A be a $2 imes 2$ matrix whose trace is 5 and whose determinant is 0.	
The smaller eigenvalue of \boldsymbol{A} is	
The larger eigenvalue of <i>A</i> is	

Question 12

1 pts

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Consider the matrix
$$\begin{pmatrix} 0 & -2 \\ 1 & 2 \end{pmatrix}$$
. Which of the following is an eigenvector for the eigenvalue $1 + i$?
 $\begin{array}{c} \circ \begin{pmatrix} 2 \\ 1+i \end{pmatrix} \\ \circ \begin{pmatrix} -2 \\ 1+i \end{pmatrix} \\ \circ \begin{pmatrix} -2 \\ 1-i \end{pmatrix} \\ \circ \begin{pmatrix} 2 \\ 1-i \end{pmatrix} \end{array}$



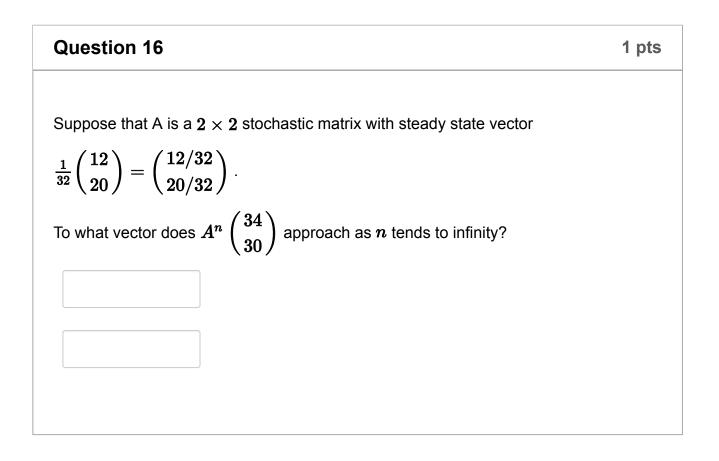
Question 14
 1 pts

 Which of the following matrices has characteristic polynomial
$$\lambda^2 - 1$$
? Select all that apply.

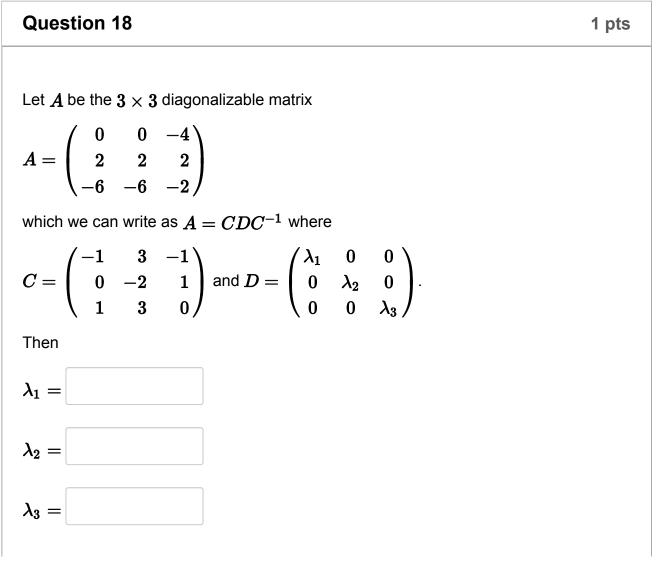
 $\left(\begin{array}{c} 0 & -1 \\ 1 & 0 \end{array} \right)$

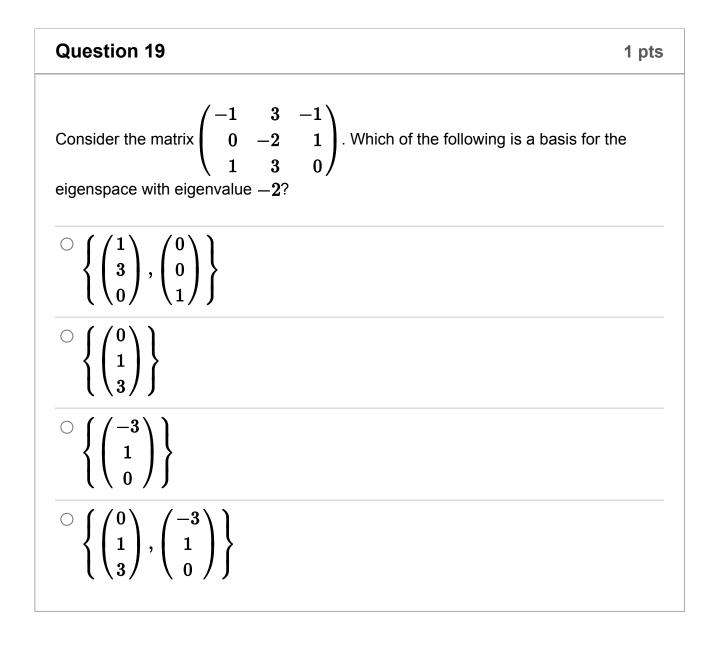
$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$		
$\Box \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$		
$egin{array}{ccc} egin{array}{ccc} -1 & 0 \ 0 & -1 \end{array} \end{pmatrix}$		

Question 1	5		1 pts
Is there a $4 \times$ eigenvalues?	·	entries) that has $oldsymbol{0}$, $oldsymbol{1}+oldsymbol{i}$, and $-oldsymbol{1}$	+i as



Question 17	1 pts
(a) Suppose A is a $2 imes 2$ matrix that has only one eigenvalue and its geom	netric
multiplicity 1. Is <i>A</i> diagonalizable? [Select]	
(b) Suppose B is a $4 imes 4$ matrix with exactly three eigenvalues -1 , 0, and	1 . Is $m{B}$
diagonalizable? [Select]	
(c) Suppose C is a $3 imes 3$ upper triangular matrix whose diagonal entries an	re 2 , 3 , and
-4. Is C diagonalizable? [Select] ✓	





Question 20					1 pts
Suppose that A is whether each of th		-	-	and 4 . Dete	rmine
(a) $oldsymbol{A}$ also has $oldsymbol{1}$ as	s an eigenvalue.	[Select]		~	
(b) $oldsymbol{A}$ is invertible.	[Select]	~	•		

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(c) If v_1 is an eigenvec	ctor for -1 and v_2	is an eigenvector fo	or ${f 4}$, then v_1 and v_2 are
linearly independent.	[Select]	~	

Question 21	1 pts
Which of the following mathematical statements implies that $egin{pmatrix}5\\-1\end{pmatrix}$ is an eigenvector for a matrix A ? Select all that apply.	
$\ \ \Box \ A \begin{pmatrix} 5 \\ -1 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$	
$\ \ \Box \ A \begin{pmatrix} 0 \\ 0 \end{pmatrix} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$	
$egin{array}{c} & \square & A egin{pmatrix} 5 \ -1 \end{pmatrix} = egin{pmatrix} -5 \ 1 \end{pmatrix}$	
$^{\square} A inom{5}{-1} = inom{\sqrt{50}}{-\sqrt{2}}$	
$\ \ \Box \ A \begin{pmatrix} 5 \\ -1 \end{pmatrix} = \begin{pmatrix} -1 \\ 5 \end{pmatrix}$	

Not saved Submit Quiz