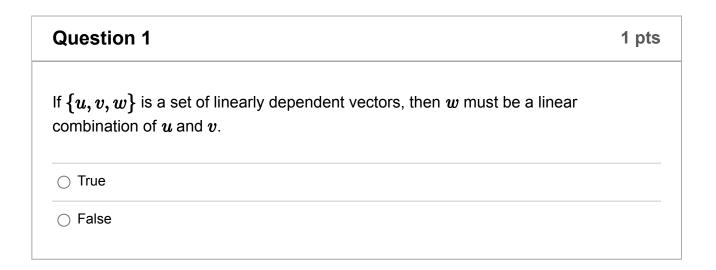
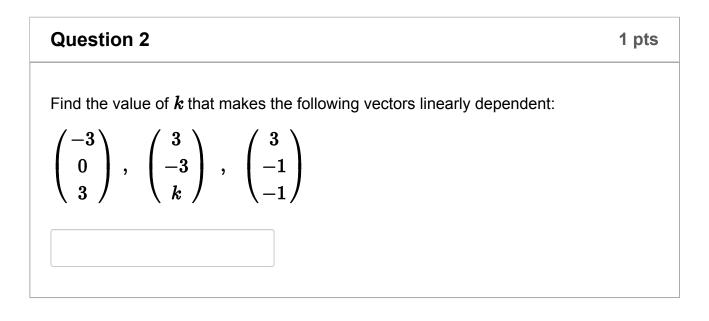
Math 1553 Reading Day Spring 2023

(1) This is a preview of the published version of the quiz

Started: Mar 18 at 12:08pm

Quiz Instructions

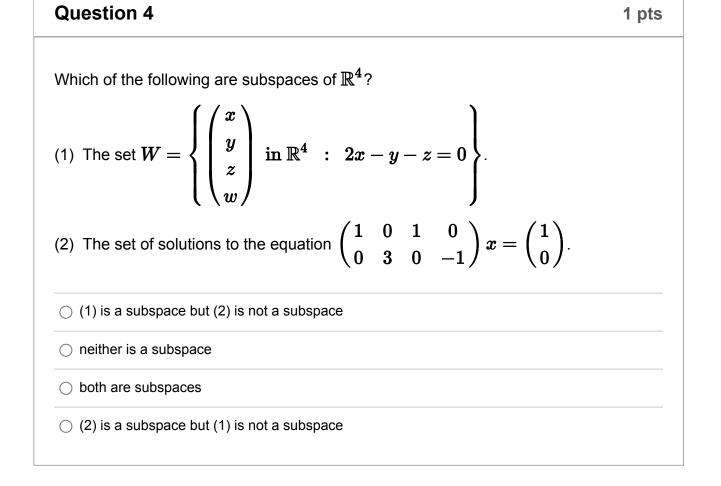


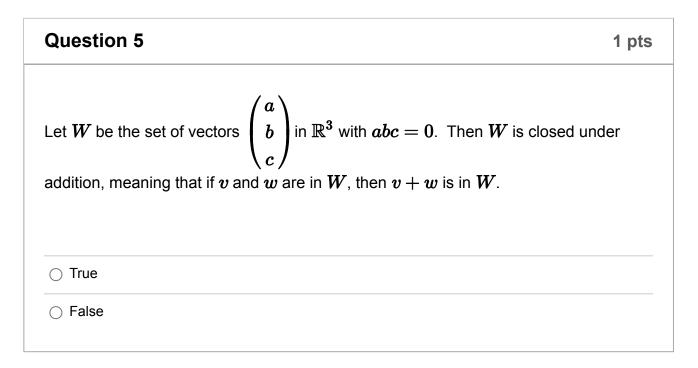


Question 3 1 pts If $\{u,v\}$ is a basis for a subspace W, then $\{u-v,u+v\}$ is also a basis for W.

⊖ True

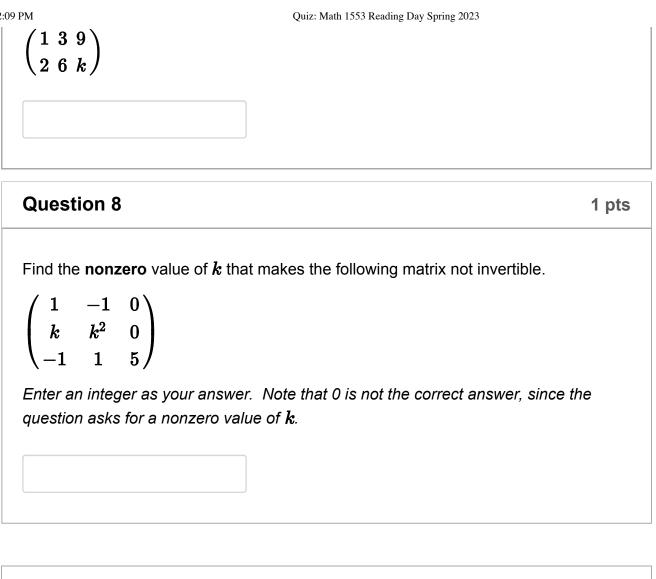
O False





Question 6			1 pts
Match the transformations given A. $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$ B. $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$ C. $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ D. $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$ E. $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$	below with their corre	esponding $2 imes 2$ matrix.	
Counter-clockwise rotation by 90 degrees	[Choose]	\checkmark	
Reflection about the line y=x	[Choose]	\checkmark	
Clockwise rotation by 90 degrees	[Choose]	\checkmark	
Reflection across the x-axis	[Choose]	\checkmark	
Reflection across the y-axis	[Choose]	\checkmark	

Question 7	1 pts
Find the value of $m k$ so that the matrix transformation for the following matrix onto.	is not



Question 9	1 pts
Match the following definitions with the corresponding term describing a linear transformation $T:\mathbb{R}^m o\mathbb{R}^n$.	
Each definition should be used exactly once.	
A. For each y in \mathbb{R}^n there is at most one x in \mathbb{R}^m so that $T(x)=y$.	
B. For each y in \mathbb{R}^n there is at least one x in \mathbb{R}^m so that $T(x)=y$.	
C. For each y in \mathbb{R}^n there is exactly one x in \mathbb{R}^m so that $T(x)=y$.	
D. For each x in \mathbb{R}^m there is exactly one y in \mathbb{R}^n so that $T(x)=y$.	
T is a transformation [Choose]	
T is one-to-one	

[Choose]	\checkmark	
s onto	[Choose]	\checkmark
one-to-one and onto	[Choose]	\checkmark

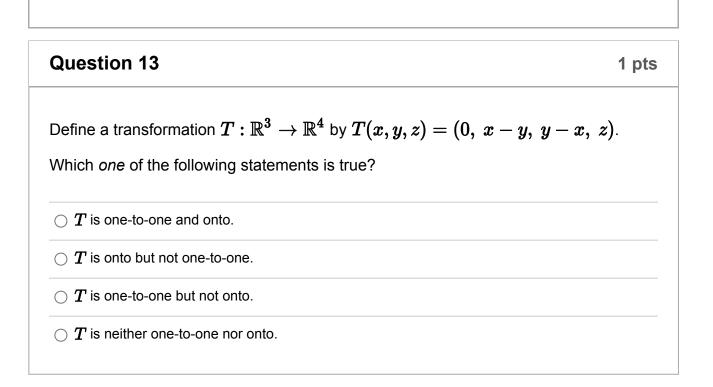
Question 10	1 pts
Suppose $oldsymbol{A}$ is a $oldsymbol{4} imesoldsymbol{6}$ matrix. Then the dimension of the null space of $oldsymbol{A}$ is at 2.	most
⊖ True	
⊖ False	

Question 111 ptsComplete the entries of the matrix A so that
$$\operatorname{Col}(A) = \operatorname{Span}\left\{\begin{pmatrix}1\\2\end{pmatrix}\right\}$$
 and $\operatorname{Nul}(A) = \operatorname{Span}\left\{\begin{pmatrix}1\\1\end{pmatrix}\right\}$. $A = \begin{pmatrix} r & 1\\ s & 2 \end{pmatrix}$, where $r =$ and $s =$

1 pts

Suppose $T: \mathbb{R}^7 \to \mathbb{R}^9$ is a linear transformation with standard matrix A, and suppose that the range of T has a basis consisting of 3 vectors. What is the

dimension of the null space of A ?



Question 14	1 pts
Suppose that A is a $7 imes 5$ matrix, and the null space of A is a I matrix transformation $T(v)=Av$. Which of the following state about the range of T ?	•
\bigcirc It is a 6-dimensional subspace of ${\mathbb R}^7$	
\bigcirc It is a 4-dimensional subspace of \mathbb{R}^5	
\bigcirc It is a 6-dimensional subspace of ${\mathbb R}^5$	
\bigcirc It is a 4-dimensional subspace of ${\mathbb R}^7$	

Say that $S:\mathbb{R}^2 o\mathbb{R}^3$ and $T:\mathbb{R}^3 o\mathbb{R}^4$ are linear transformations. Which c following must be true about $T\circ S$?	of the
○ It is not one-to-one	
○ It is one-to-one	
○ It is onto	
\bigcirc The composition is not defined	
○ It is not onto	
Question 16	1 pts
Suppose that A is an invertible $n imes n$ matrix. Then $A+A$ must be invertible	

○ False

Question 17	1 pts
Suppose A is a $3 imes 3$ matrix and the equation $Ax = \begin{pmatrix} -1 \\ 3 \\ 2 \end{pmatrix}$ has exactly or solution.	Ie
Then A must be invertible.	
⊖ True	
⊖ False	

Question 18	1 pts
Suppose that A and B are $n~ imes n$ matrices and AB is not invertible.	
Which one of of the following statements must be true?	
○ None of these	
○ A is not invertible	
\bigcirc At least one of the matrices A or B is not invertible	
○ B is not invertible	

1 pts

Suppose A and B are 3×3 matrices, with $\det(A) = 3$ and $\det(B) = -6$. Find $\det(2A^{-1}B)$.

Question 20

1 pts

Let A be the 3×3 matrix satisfying $Ae_1 = e_3$, $Ae_2 = e_2$, and $Ae_3 = 2e_1$ (recall that we use e_1 , e_2 , and e_3 to denote the standard basis vectors for \mathbb{R}^3).

Find $\det(A)$.

Question 21

Suppose A is a square matrix and $\lambda = -1$ is an eigenvalue of A.

Which one of the following statements must be true?

 \bigcirc For some nonzero x, the vectors Ax and x are linearly dependent.

 \bigcirc Nul $(A + I) = \{0\}$

 \bigcirc The equation \(Ax = x \\)has only the trivial solution.

 \bigcirc A is invertible.

 \bigcirc The columns of A + I are linearly independent.

Question 22

1 pts

Suppose A is a 4 x 4 matrix with characteristic polynomial $-(1-\lambda)^2(5-\lambda)\lambda$.

What is the rank of A?

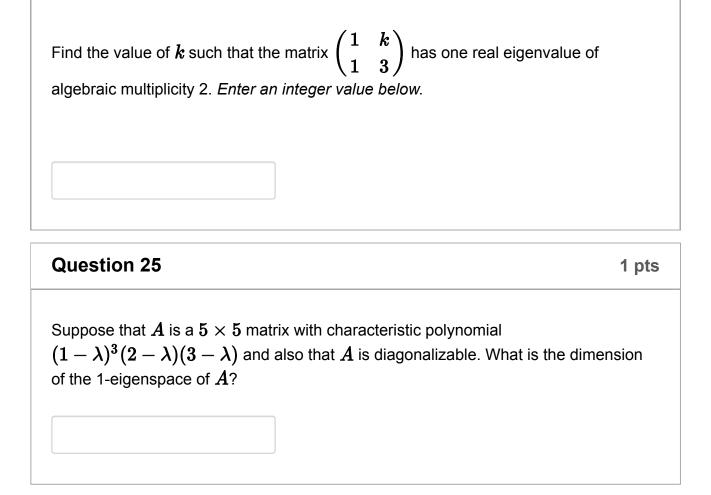
Question 23

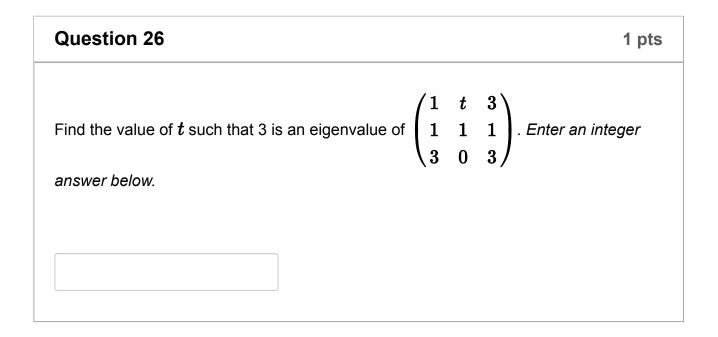
1 pts

Let $T: \mathbb{R}^2 o \mathbb{R}^2$ be the transformation that reflects across the line $x_2 = 2x_1$.

Find the value of k so that $A \begin{pmatrix} 2 \\ k \end{pmatrix} = \begin{pmatrix} 2 \\ k \end{pmatrix}$.

Question 24





Say that A is a 2×2 matrix with characteristic polynomial $(1 - \lambda)(2 - \lambda)$. What is the characteristic polynomial of A^2 ?

$\bigcirc \ (1-\lambda)(2-\lambda)$	
$\bigcirc \ (1-\lambda)^2(2-\lambda)^2$	
$\bigcirc \ (1-\lambda^2)(2-\lambda^2)$	
$\bigcirc \ (1-\lambda^2)(4-\lambda^2)$	
$\bigcirc (1-\lambda)(4-\lambda)$	

Question 28

1 pts

Suppose that a vector x is an eigenvector of A with eigenvalue 3 and that x is also an eigenvector of B with eigenvalue 4. Which of the following is true about the matrix 2A - B and x:

 $\bigcirc x$ is an eigenvector of 2A-B with eigenvalue 1

None of these

 $\bigcirc m{x}$ is an eigenvector of 2A-B with eigenvalue 4

 $\bigcirc x$ is an eigenvector of 2A-B with eigenvalue 2

 $\bigcirc x$ is an eigenvector of 2A - B with eigenvalue 3

Question 29

1 pts

Suppose that A is a 4×4 matrix with eigenvalues 0, 1, and 2, where the eigenvalue 1 has algebraic multiplicity two.

Which of the following must be true?

(1) A is not diagonalizable

(2) A is not invertible

○ Both (1) and (2) must be true

○ Neither statement is necessarily true

 \bigcirc (2) must be true but (1) might not be true

○ (1) must be true but (2) might not be true

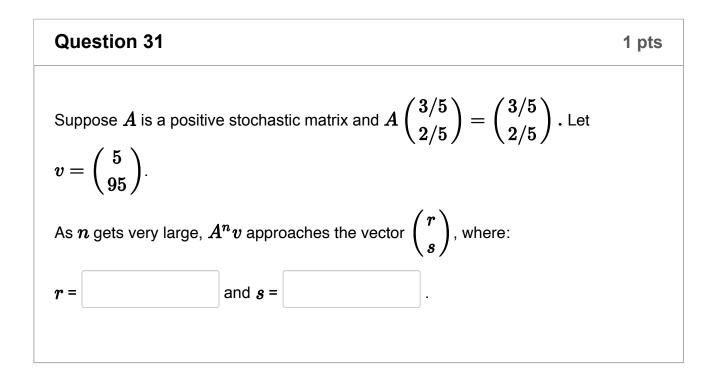
Question 30

1 pts

Suppose A is a 5 \times 5 matrix whose entries are real numbers. Then A must have at least one real eigenvalue.

⊖ True

○ False



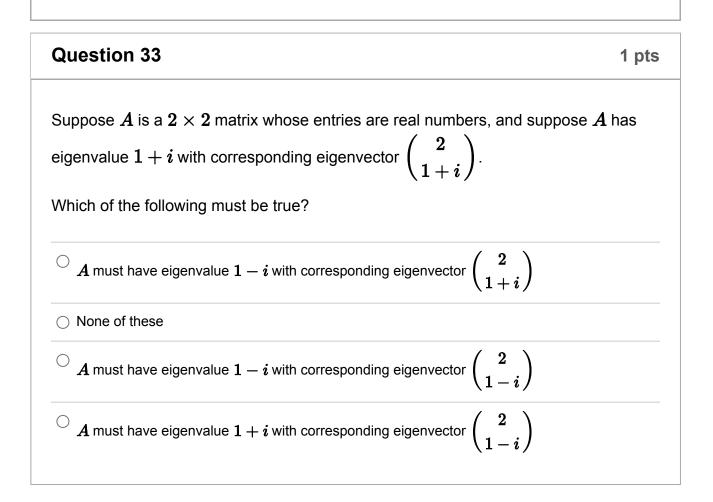
Question 32

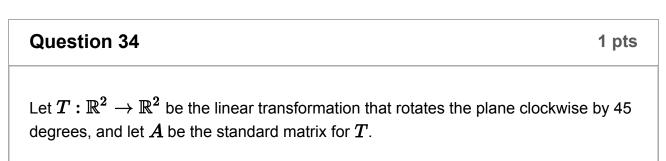
Suppose that A is a 4×4 matrix of rank 2. Which one of the following statements must be true?

\bigcirc none of these

 $\bigcirc A$ is diagonalizable

- \bigcirc *A* cannot have four distinct eigenvalues
- \bigcirc **A** is not diagonalizable
- *A* must have four distinct eigenvalues





Which one of the following statements is true?



- \bigcirc $oldsymbol{A}$ has two distinct real eigenvalues
- \bigcirc *A* has two distinct complex eigenvalues.
- $\bigcirc A$ has one real eigenvalue with algebraic multiplicity two

1 pts

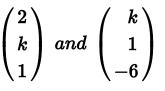
Suppose u and v are orthogonal unit vectors (to say that a vector is a unit vector means that it has length 1). Find the dot product

 $(3u-8v)\cdot 4u$

Question 36

1 pts

Find the value of \boldsymbol{k} that makes the following pair of vectors orthogonal.



Your answer should be an integer.

Question 37

1 pts

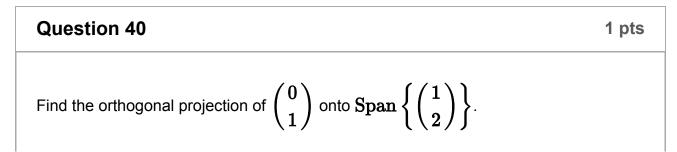
If W is a subspace of \mathbb{R}^{100} and v is a vector in W^{\perp} then the orthogonal projection of v to W must be the 0 vector.

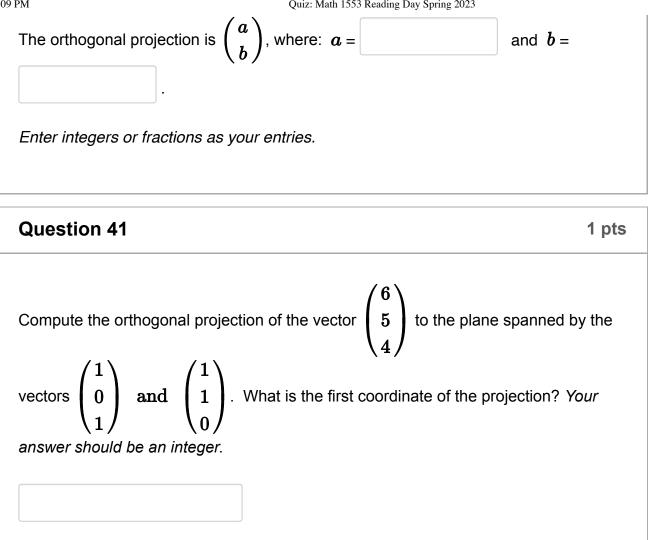
⊖ True

False

Question 38	1 pts
Suppose W is a subspace of \mathbb{R}^n . If x is a vector and x_W is the orthogonal projection of x onto W , then $x \cdot x_W$ must be 0.	
⊖ True	
⊖ False	

Question 39	1 p
Suppose that A is a $3 imes 3$ invertible matrix. What is the dot product second row of A and third column of A^{-1} equal to?	between the
○ 1	
○ 2	
○ 0	
○ -2	



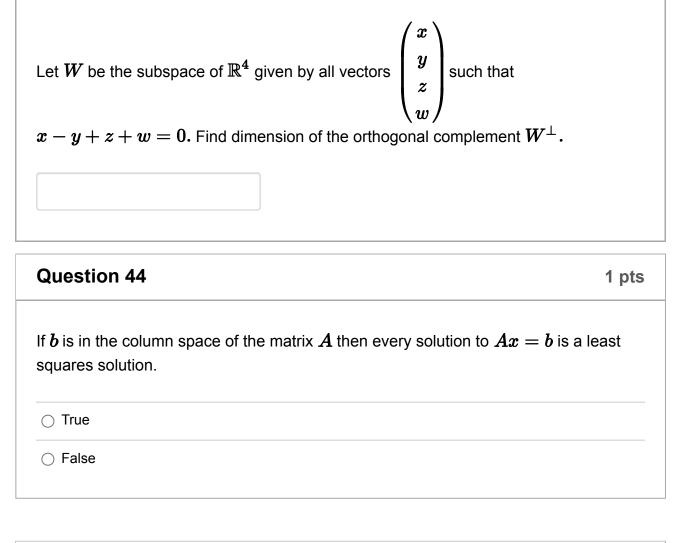




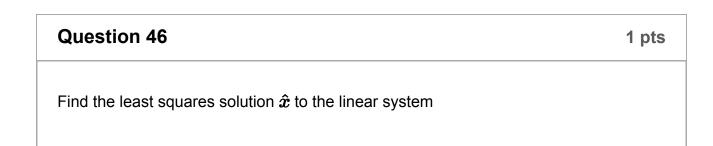
Suppose B is the standard matrix for the transformation $T:\mathbb{R}^3 o\mathbb{R}^3$ of orthogonal projection onto the subspace $W = \left\{ \begin{pmatrix} x \\ y \\ z \end{pmatrix} \text{ in } \mathbb{R}^3 \mid x+y+2z=0 \right\}.$

What is the dimension of the 1-eigenspace of B?

Question 43



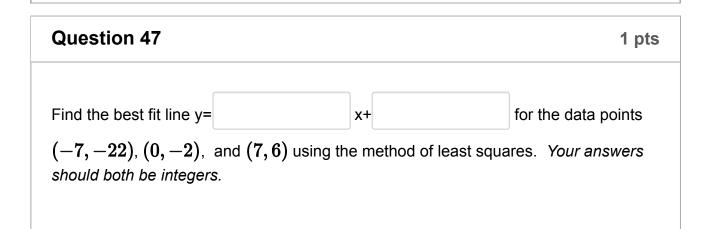
If A is an $m imes n$ matrix, b is in \mathbb{R}^m , and \hat{x} is a least squares solution to	Ax = b,
then \hat{x} is the point in $\mathrm{Col}(A)$ that is closest to b .	
⊖ True	
⊖ False	

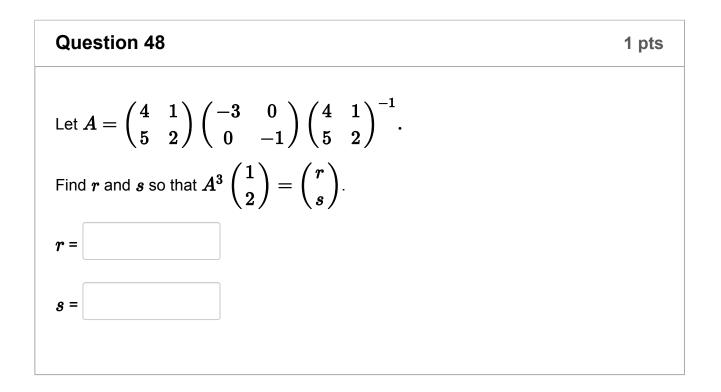


$$egin{pmatrix} 6 \ -2 \ -2 \end{pmatrix} x = egin{pmatrix} 14 \ -2 \ 0 \end{pmatrix}$$
 .

If your answer is an integer, enter an integer.

If your answer is not an integer, enter a fraction.





Question 49

 True False 	If $oldsymbol{A}$ is a dia	agonalizable $6 imes$	6 matrix, then	$m{A}$ has $m{6}$ dist	inct eigenvalue	S.
	⊖ True					
	○ False					

Question 50	1 pts
Find the eigenvalues of the matrix $A=inom{1}{4}$	$\begin{pmatrix} 4 \\ 7 \end{pmatrix}$ and write them in increasing order.
The smaller eigenvalue is λ_1 =	
The larger eigenvalue is λ_2 =	

Not saved Submit Quiz
