#	Question	Answer(s)
1	What,Äôs the difference between pivots and diaganols?	live answered
2	does it always start at 0,0?	
3	Do we always work in the real number space for this class?	We will start to see complex numbers at some point (eigenvalue, etc.). For now we only work in the real space
4	what does the r mean	the "R" means the real number space
5	where is the dicussion check off ?	It will be posted on the course website
6	Does the arrow also denote matricies, or is it just vectors?	live answered
7	What did the R^2 represent from previous slide?	It means 2-dimensional real number space
8	would a 2x2 mat be in R^2 or R^4	We typically use the notation R^(2x2)
9	why are transpose vectors useful?	Just an example, when you want to convert a row vector to a column vector
10	both	live answered
11	When will this lecture be posted?	Should be posted right after the lecture
12	Is there a variable form of scaling vectors? Like multiply everything inside by x?	
13	what's the difference between a row and column vector? in what event would we use one over the other	live answered
14	what is the formula for matrix transposing?	
15	Are the lines above the matrices x1 & x2 a typo?	
16	Does Transpose works both ways?	
17	How to graphically represent a column vector?	The graphs of a column vector and a row vector will look the same if they are a transpose of each other.
18	Is transposing only from column to row?	Nope, it works in either way.
19	how would you graph a row vector?	The graphs of a column vector and a row vector will look the same if they are a transpose of each other.
20	does transposing a vector make it graphically look different?	Nope, graphically they look the same.
21	Would taking the transpose of a row vector imply a column vector? Or is it only specific to changing a column vector to a row vector?	It works in both ways. The transpose of a row vector is a column vector.
22	what are i an j?	
23	how do we get a scaler by multiplying two matrices?	
24	does multipliying vectors require that we have the same size vectors?	
25	Multiplying matricies is not communicative right?	
26	Is vector*vector the dot product?	
27	is the only difference between column and row vector, the way its oriented (horizontal and vertical)?	When you do matrix-vector multiplication, you have to match the dimensions, so there will be a difference between column vectors (nx1) and row vectors (1xn)
28	Does that mean A x B does not equal B x A?	Yes, typically they are not the same
29	is the 11 notation in matrix elements,Äô subscripts 1*1 or eleven?	you may interpret it as (1,1). (row number, column number)
30	would this be a dot product or cross product?	a dot product
31	why is she using the transpose	live answered

32	is this the same as dot product?	
33	why are we transposing vector y?	live answered
34	was y initially a vertical vector and we transpose it horizontally?	live answered
35	why is the y vector transposed?	live answered
36	What is a scalar?	A 1-dimensional number
37	so how would this work when we dont have one row or one line vectors?	
38	What does vector-vector multiplication represent visually?	
39	What does the answer tell us though?	
40	what does the scalar product which results from the multiplication of the transposed vector and column vector repersent geometrically?	It relates to projecting one vector onto the other one
41	Can we do nx1 1xn to make a nxn matrix?	Yes mathematically you can. But that will not be a dot product
42	Does it matter which vector is transposed	For dot product we want to transpose the first vector to a row vector
43	If we do not transfer y, would the anwer be the same?	
44	Can we multiply two column vectors?	No. A nx1 vector multiplies a nx1 vector is not defined.
45	Does transposing change the answer at all? Or does it work like one of the properties we talked about where the answer never changes?	Dot product is commutative. (x^T)y = (y^T)x
46	what would the cross product look like	The cross product will result in a vector instead of a scalar
47	What would be the real world application of multiplying vectors?	
48	will we denote the final result as a 1x1 matrix with brackets or just a single number?	either way is okay
49	Can the cross product or vector product of two vectors also be done using matrix multiplication, or is it just for the scalar product?	Cross product can be done in the determinant form :)
50	Do we get a scalar when multiplying vectors and a matrix/vector after multiplying matricies?	
51	Would we write the answer in a square bracket [] or just a number for this 1x1 scalar?	Both ways are okay
52	what would happen when you multiply y of nx1 dimension instead of 1xn with x?	The inside dimension should match. Multiplying a nx1 by another nx1 is not defined
53	wait why is the T over y again?	we want to transpose y to a 1xn row vector so it can multiply a nx1 column vector
54	Does our notation for this class mater when discussing vectors, like can we underline the vectors or should we put the arrow on top?	please put an arrow on top
55	Can you apply basic algebra properties to matrices? Like factoring out a matrix?	We will cover this later. But we can multiply a scalar to every element in a matrix.
56	if dot product is commutative, how come this isn,Äôt commutative?	dot product is commutative: (y^T)x = (x^T)y.
57	So we always want a scalar result? If not, why would we choose one over the other.	For dot product we want a scalar result.
58	how do you know which vector to transpose?	For dot product, you will transpose the first vector into a row vector
59	can you go over why the first example gives a 1x1 scalar and this one gives a matrix?	If we multiply 1xn and nx1, the result is 1x1. If we multiply nx1 and 1xn, the result is nxn.

60	could you explain what dot product means geometrically?	It relates to projecting a vector onto the other one. We will cover more details later.
61	why is dot product commutative? Are the result of the two operations different, aren,Äôt they?	(x^T)y = (y^T)x
62	how do we know when we should add the products and when we shouldnt?	We should always add the products. But when there is only one product we will just use that product.
63	could you go over the difference in the process between matrix and vector multiplication and matix and matrix multiplication again?	live answered
64	is multiplying a scaler by a matrix still the same? by multiplying each element in the matric by the scalar?	Yes!
65	whyy are we adding in matrix vector mult but not the last vectorxvector multiplication we did?	
66	when multiplies vectors (ex vector x times vector y), is this equal to (vector y times vector x), so in this case, could we transpose x instead of y (since she transposed y in the example)	Yes, (x^T)y = (y^T)x
67	why are we multiplying row with column and not column with column ?	It's basically defined by the rule of matrix multiplication.
68	Wait I thought B was supposed to have m rows and 1 column?	Yes. b is mx1. In the slide, each row of b is a summation (still one column)
69	I understand that n has to be the same when we are dealing with a matrix and a vector, but it doesn't matter when we are multiplying two vectors, right?	It does matter for multiplying vectors
70	for the vector notation, is the arrow supposed to be a full arrow or half arrow?	either way is okay
71	Could you explain what the i and j are in the mathematical formula again?	i means the i-th row of b. j means the j-th column of A and the j-th row of x
72	what did rows represent?	
73	could you explain the row view for another second please?	each row will be a linear equation, so the entire thing is a system of equations
74	can someone repeat what row view tells us	each row will be a linear equation, so the entire thing is a system of equations
75	When is it unique??	
76	so after we do matrix multiplication, do we always then try to do gaussian elimination on the remaining matrice?	No, for matrix multiplication we don't do Gaussian elimination on the results (unless you need to solve that equation)
77	so if an entire row is 0 there is no solution?	No. If an entire row is 0 there can be solution(s) depending on the other rows.
78	Is it possible to solve with these dimensions? Wouldn,Äôt you end up with two unknown variables?	This one will probably result in infinite many solutions
79	is it possible to get a unique solution when there are fewer equations than variables?	No
80	what do you mean when you say normalize?	make the leading coeff. be 1
81	Don,Äôt we have three eqns for 4 unknowns here	Yes we have 3 eqns and 4 unknowns.

82	on exams, are we expected to reduce to ref or rref?	reduce to ref so you know whether it's unique solution, no solution or infinite many solutions. After that to solve the equations (if there are solution(s)) you want to reduce to rref
83	isn,Äôt it called reduced row echellon form?	live answered
84	why was the result of the inital matrix-vecor multiplication [2 3 1]? shouldn,Äôt it be [4 3 1] or am I missing something	
85	is it wrong to call the leading coefficients pivots in this case?	They are pivots in this case
86	What does it mean to say 'leading coefficiens to right of row above'?	The leading coeff is to the right of the leading coeff in the row above
87	do we have to make it rref or can we just use row manipulation to solve for variables after getting to ref	You can do either way.
88	why is it reduced row echelon, since there is a 1 in the fourth column in the first row	because that column does not have a pivot, so there can be non-zero elements in the first row
89	what is back substitution?	
90	Can you go over back substituion again?	
91	what exactly is back substitution? what are we substituting?	
92	So RREF is bacially having only one non-zero value per column right?	having only one non-zero value per column if there is a pivot in that column
93	What do you mean by backsubstitution?	
94	can we make x1 as free variable?	live answered
95	After this lecture, will we know everything we need for HW1?	
96	why wouldn,Äôt x1 also be a free variable?	live answered
97	Could you not consider x_4 to be a basic variable and x_1 to be a free variable?	live answered
98	why is x4 free and not x1?	live answered
99	if we moved the top equation to the bottom row, would x4 become a basic variable and x1 become a free variable?	live answered
100	could x1 also be the free variable because we don't know either of x1 or x4?	live answered
101	why is x1 not free as well?	live answered
102	could x1 be the free variable instead of x4 or does it have to be x4?	live answered
103	can we assume that everytime we have more unknowns than equations that we will have inf solutions?	It's still possible to have no solution
104	would'nt x4 be 2 because x1 is 1 and total of that row is 3?	
105	why cant you skip the parameter and just use x4	
106	would we still call this underdetermined?	
107	So x1 becomes dependent on the free variable x4?	yes
108	How do you know which one is the free variable? Is it because it's the only non-pivot with a non-zero number?	
109	or is it only when we reduce it that we can make that assumption	
110	should we set it as t? or should we choose a real number?	
111	what is jargon?	
112	if i am writing on chat, will anybody read it?	
113	How did we get the 4 different values in the x vector? Are the last 3 standard or do they change?	
114	Can you only do this if there is only 1 free variable	
115	or should i write here on Q&A?	
116	Any time you have a free variable there is infinite solutions?	
117	Can we predict the # of free variables based on m, n vals? For example here we have 4 variables but 3 equations, so is it necessarily the case that we have n-m free variables?	
118	For homework questions where we have infinite solutions, should we make a parametric solution or could we assign X4 to some number and solve like that?	
119	Could you explain how we can determine if there is a unique solution by just looking at the last row?	
120	What would a no solution one look like? I thought because we had 4 unknowns and 3 equations it would likely be a no solution.	For example if you have one equation saying x1+x2+x3+x4 =1 and the other one saying x1+x2+x3+x4 = 2

121	how do you solve for t? or is the question done now and theres no work left to do?	The question is done. t can be any real number
122	isnt it 2 and not 3?	
123	so can free variables never be in the pivot positions?	By convention they will not be in the pivot positions
124	In that example we just have 4 unknowns 3 equations right, so just not enough information to solve right?	That's correct
125	why isn,Äôt the las row 1 0 0 1 ?	live answered
126	if we find out that there is no solutions early on, do we still have to reduce the matrix into rref?	Nope
127	wait nvmrnd ^^	live answered
128	why not have 5 rows	
129	the last row in the original matrix should be 1 0 0 1 b5 right?	Yes
130	Why did we pick [1 0 0 0 | b5] if we are unable to probe individual pixels?	
131	is she missing b4 in her bottom left matrix	
132	all rref are upper triangular but not vice versa right	