	MATH 10 - TEST 1	
	(CHAPTER 1 and 2)	
100 points	**Spring 2012**	**NAME:** Solns

YOU MUST SHOW YOUR WORK. PRESENTATION COUNTS!
Phones must be OFF and put away. No graphing calculators allowed. No scratch paper allowed.

CIRCLE T FOR TRUE, F FOR FALSE. *(3 points each)*

T F (1) For any nxn matrices A, B, and C, if AB = AC, then B = C.

T F (2) If A and B are invertible nxn matrices, then AB is invertible, and $(AB)^{-1} = B^{-1}A^{-1}$.

T F (3) $-3R_1 + R_2 \to R_1$ is an elementary row operation..

T F (4) The associative law for multiplication holds true for matrix multiplication.

T F (5) If A and B are square matrices such that AB = **0** and B is invertible, then A = **0**.

T F (6) If A is invertible then the system AX = **0** has infinitely many solutions.

T F (7) If A is row equivalent to B and A is invertible then B is invertible.

T F (8) If AB=I then B is the inverse of A. must be square

SHOW ALL WORK NEATLY AND PUT BOX AROUND ALL ANSWERS.

(9) Compute $\begin{vmatrix} 3 & -1 & 2 & 0 \\ -2 & -3 & 1 & 3 \\ 0 & -1 & 4 & 1 \\ 5 & 0 & -2 & 3 \end{vmatrix}$. -170 *(8 points)*

(10) a) i) $[8\ 19\ 21]$ ii) $B^{-1} = \begin{bmatrix} 1 & -2 & 1 \\ 0 & 1 & -1 \\ -1/3 & 0 & 2/3 \end{bmatrix}$ iii) $\begin{bmatrix} 1 & 0 & -1/3 \\ -2 & 1 & 0 \\ 1 & -1 & 2/3 \end{bmatrix}$ iv) $\frac{1}{3}$

b) $A = \begin{bmatrix} 1 & 0 & -2 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} B$

(11) $(9, -4, 2)$

(13) Proof: Since B is $n \times m$, $B^T = m \times n$. So $\underset{m\times n}{B^T}\ \underset{n\times n}{A}\ \underset{n\times m}{B}$ is $m \times m$.

$(B^TAB)^T = B^TA^T(B^T)^T$ By transpose property
$= B^TA^TB$ " "
$= B^TAB$ $A^T = A$ since A symmetric.

$\therefore$ B^TAB is symmetric ∎

(14) Proof $\det(A) = a^2+b^2+c^2+1 \neq 0$ for all real a, b, c so A is invertible by big thm

(15) If $B \neq 1$, system has a unique solution.
If $B = 1$ and $C \neq -8$, there is no solution
If $B = 1$ and $C = -8$ there are infinitely many solutions