# Philadelphia University <br> Department of Basic Sciences 

## Exam 2

Linear Algebra 2
16-5-2006

Each problem is worth 4 points.

1. Find the inverse of the linear transformation $T(x, y)=(5 x+6 y, 4 x+5 y)$.
2. Evaluate $\operatorname{det} A$ by reducing $A$ to a triangular matrix.

$$
A=\left[\begin{array}{rrrr}
2 & 2 & 2 & 2 \\
1 & 3 & 1 & 3 \\
-1 & 0 & 4 & 3 \\
0 & 5 & -3 & -2
\end{array}\right]
$$

3. Write the matrix $\left[\begin{array}{ll}2 & 3 \\ 3 & 5\end{array}\right]$ as a product of elementary matrices.
4. Find the solution for $z$ using Cramer's Rule.

$$
\begin{aligned}
x+2 y+3 z & =3 \\
2 x+9 y+3 z & =11 \\
x+4 z & =1
\end{aligned}
$$

5. Find a number $k$ such that det $\left[\begin{array}{ccc}2 a_{1}-b_{1} & 2 a_{2}-b_{2} & 2 a_{3}-b_{3} \\ 7 c_{1} & 7 c_{2} & 7 c_{3} \\ a_{1}+b_{1} & a_{2}+b_{2} & a_{3}+b_{3}\end{array}\right]=k \operatorname{det}\left[\begin{array}{lll}a_{1} & a_{2} & a_{3} \\ b_{1} & b_{2} & b_{3} \\ c_{1} & c_{2} & c_{3}\end{array}\right]$.
