

DAWSON COLLEGE
Mathematics Department
Final Examination
Linear Algebra
201-NYC -05 Computer Science
May 25th, 2011

1.

10. (4+4+3 marks) Let $\vec{u} = (-1, 0, 3)$ and $\vec{v} = (2, 1, -4)$
- a) Find a unit vector perpendicular to both \vec{u} and \vec{v}
 - b) Find $Proj_{\vec{u}+\vec{v}}(2\vec{u})$
 - c) Find the area of the triangle determined by \vec{u} and \vec{v}
11. (3 marks) Suppose $\vec{u} \cdot (\vec{v} \times \vec{w}) = 2$. Find $(3\vec{v} \times \vec{u}) \cdot 4\vec{w}$
12. (3 marks) Find $(3\vec{u} + 4\vec{v}) \times (2\vec{u} - \vec{v})$, if $u \times v = (-1, 2, 3)$

Answers

1. a) $x_1 = 4 + t$, $x_2 = 0$, $x_3 = 1 + 2t$, $x_4 = t$. b) Ex.: $x_1 = -4$, $x_2 = 0$, $x_3 = 1$, $x_4 = 0$.

2. a) impossible; b) $4b_1 + b_2 + b_3 = 0$; c) $4b_1 + b_2 + b_3 \neq 0$

3. a) $A^{-1} = \begin{bmatrix} 8 & -1 & 5 \\ 5 & -1 & 3 \\ 1 & 0 & 1 \end{bmatrix}$