

**MATH 0280 Final Examination, Sample 2 - ANSWERS**

**Problem 1.** 1/4

**Problem 2.**

$$F = \begin{pmatrix} 0 & 0 \\ \frac{\sqrt{3}}{2} & 0 \end{pmatrix}$$

**Problem 3.** No

**Problem 4.** a)  $[3/\sqrt{10}, 0, -1/\sqrt{10}]$ ,  $[2/7, 3/7, 6/7]$   
b)  $[601/490, 24/49, 333/490]$

**Problem 5.** a)  $\lambda^2 + 2\lambda + 1$   
b) Not possible (the eigenvalue  $\lambda = -1$  has the algebraic multiplicity 2, and the geometric multiplicity 1.)

**Problem 6.**

- a)  $[1, 2, 0]$ ,  $[0, 1, 1]$ . (column vectors are listed horizontally here)
- b)  $[1, 0, 2, 3]$ ,  $[0, 1, 0, -1]$ .
- c)  $[-3, 1, 0, 1]$ ,  $[-2, 0, 1, 0]$  (column vectors are listed horizontally here)
- d)  $rk(A) = nullity(A) = 2$ .

Note: the correct answers for the parts a),b),c) are not unique.