

Instructions: Clearly answer each of the questions below. Remember to check the back side. Show your work and any formulas you employ. Simplify all answers as far as possible.

1. Consider the matrix  $M = \begin{bmatrix} -2 & -5 \\ 5 & 7 \end{bmatrix}$ .

(a) (2 pt) Find the characteristic polynomial.

$$\underline{\lambda^2 - 5\lambda + 11 = 0}$$

(b) (2 pt) What are the eigenvalues?

$$\underline{\lambda \in \frac{5 \pm i\sqrt{19}}{2}}$$

2. Consider the matrix  $M = \begin{bmatrix} -28 & -150 \\ 5 & 27 \end{bmatrix}$ .

(a) (2 pt) Find the eigenspace of  $M$  for  $\lambda = -3$ .

$$\underline{\text{span} \left\{ \begin{bmatrix} -6 \\ 1 \end{bmatrix} \right\}}$$

(b) (2 pt) Find the eigenspace of  $M$  for  $\lambda = 2$ .

$$\underline{\text{span} \left\{ \begin{bmatrix} -5 \\ 1 \end{bmatrix} \right\}}$$