MAT 167 Homework 8

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6.1

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a We have $f = x^2 + 2bxy + 81y^2$. So $a = 1$ and $c = 81$. We need $ac > b^2$ or $81 > b^2$. So A is positive definite when $-3 < b < 3$.

b

$$\begin{bmatrix} 1 & b \\ b & 9 \end{bmatrix} = \begin{bmatrix} 1 & b \\ 0 & 9 - b^2 \end{bmatrix}$$

So we have

$$A = \begin{bmatrix} 1 & 0 \\ b & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 0 & 9 - b^2 \end{bmatrix} \begin{bmatrix} 1 & b \\ 0 & 1 \end{bmatrix}$$

9

17

6.2

6

19

29

41

6.3

5

9

18

6.4

2

4