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1. **(1 pt) local/Library/UI/Fall14/quiz2_9.pg**
Supppose A is an invertible $n \times n$ matrix and v is an eigenvector of A with associated eigenvalue -5. Convince yourself that v is an eigenvector of the following matrices, and find the associated eigenvalues:
1. A^8, eigenvalue =

- A. 16
- B. 81
- C. 125
- D. 216
- E. 1024
- F. 390625
- G. 2000
- H. None of those above

2. A^{-1}, eigenvalue =

- A. -0.5
- B. -0.333
- C. -0.2
- D. -0.125
- E. 0
- F. 0.125
- G. 0.333
- H. 0.5
- I. None of those above

3. $A - 4I_n$, eigenvalue =

- A. -8
- B. -4
- C. -5
- D. 0
- E. 2
- F. 4
- G. -9
- H. 10
- I. None of those above

4. $8A$, eigenvalue =

- A. -36
- B. -28
- C. -40
- D. -12
- E. 0
- F. 24
- G. 36
- H. None of those above

Correct Answers:

- F
- C
- G
- C

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2. **(1 pt) local/Library/UI/Fall14/quiz2_10.pg**
If $v_1 = \begin{bmatrix} 5 \\ -5 \end{bmatrix}$ and $v_2 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$
are eigenvectors of a matrix A corresponding to the eigenvalues $\lambda_1 = -2$ and $\lambda_2 = 4$, respectively, then
a. $A(v_1 + v_2) =$

- A. $\begin{bmatrix} -3 \\ 5 \end{bmatrix}$
- B. $\begin{bmatrix} -2 \\ 4 \end{bmatrix}$
- C. $\begin{bmatrix} -6 \\ 5 \end{bmatrix}$
- D. $\begin{bmatrix} 10 \\ 6 \end{bmatrix}$
- E. $\begin{bmatrix} 12 \\ 4 \end{bmatrix}$
- F. $\begin{bmatrix} -6 \\ 10 \end{bmatrix}$
- G. None of those above

b. $A(-3v_1) =$

- A. $\begin{bmatrix} -12 \\ -12 \end{bmatrix}$
- B. $\begin{bmatrix} -2 \\ 8 \end{bmatrix}$
- C. $\begin{bmatrix} -6 \\ 4 \end{bmatrix}$
- D. $\begin{bmatrix} 10 \\ 6 \end{bmatrix}$
- E. $\begin{bmatrix} 30 \\ -30 \end{bmatrix}$
- F. $\begin{bmatrix} 12 \\ 4 \end{bmatrix}$
- G. $\begin{bmatrix} -6 \\ 10 \end{bmatrix}$
- H. None of those above

Correct Answers:

- F
- E

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3. **(1 pt) local/Library/UI/Fall14/quiz2_11.pg**

Let $v_1 = \begin{bmatrix} 0 \\ 2 \\ -3 \end{bmatrix}$, $v_2 = \begin{bmatrix} -1 \\ -1 \\ 0 \end{bmatrix}$, and $v_3 = \begin{bmatrix} 1 \\ 0 \\ -2 \end{bmatrix}$ be eigenvectors of the matrix A which correspond to the eigenvalues $\lambda_1 = -3$, $\lambda_2 = -1$, and $\lambda_3 = 2$, respectively, and let $v = \begin{bmatrix} -4 \\ 2 \\ -2 \end{bmatrix}$.

Express v as a linear combination of v_1, v_2, and v_3, and find Av.

1. If $v = c_1 v_1 + c_2 v_2 + c_3 v_3$, then ($c_1$, c_2, c_3)=

- A. (1,2,2)
- B. (-3,2,4)
- C. (-4,7,3)
- D. (2,2,-2)
- E. (0,1,2)
- F. (4,-1,5)
- G. None of above

2. $Av =$

- A. $\begin{bmatrix} -12 \\ 7 \\ -12 \end{bmatrix}$
- B. $\begin{bmatrix} -2 \\ 12 \\ 8 \end{bmatrix}$
- C. $\begin{bmatrix} -6 \\ 7 \\ 4 \end{bmatrix}$
- D. $\begin{bmatrix} 10 \\ 0 \\ 6 \end{bmatrix}$
- E. $\begin{bmatrix} -2 \\ -10 \\ 26 \end{bmatrix}$
- F. $\begin{bmatrix} 12 \\ 8 \\ 4 \end{bmatrix}$
- G. $\begin{bmatrix} -7 \\ -3 \\ 12 \end{bmatrix}$
- H. None of those above

Correct Answers:

- D
- E

Suppose u and v are eigenvectors of A with eigenvalue -1 and w is an eigenvector of A with eigenvalue 0. Determine which of the following are eigenvectors of A and their corresponding eigenvalues.

(a.) If 4v an eigenvector of A, determine its eigenvalue. Else state it is not an eigenvector of A.

- A. -4
- B. -3
- C. -2
- D. -1
- E. 0
- F. 1
- G. 2
- H. 3
- I. 4
- J. 4v need not be an eigenvector of A

(b.) If -9u + 6v an eigenvector of A, determine its eigenvalue. Else state it is not an eigenvector of A.

- A. -4
- B. -3
- C. -2
- D. -1
- E. 0
- F. 1
- G. 2
- H. 3
- I. 4
- J. -9u + 6v need not be an eigenvector of A

(c.) If -9u + 6w an eigenvector of A, determine its eigenvalue. Else state it is not an eigenvector of A.

- A. -4
- B. -3
- C. -2
- D. -1
- E. 0
- F. 1

- G. 2
- H. 3
- I. 4
- J. -9u + 6w need not be an eigenvector of A

Correct Answers:

- `D`
- `D`
- `J`