Course: Machine Learning - Foundations
Week 4: Test questions

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1. (1 point)

   Answer: A

2. (1 point)

   Answer: The determinant, column space and rank of a matrix are not affected by row operations on the matrix

3. (1 point)

   Answer: D

4. (1 point)

   Answer: A,D

5. (1 point)

   Answer: Determinant= product of eigen values

6. (1 point)

   Answer: Trace=sum of eigen values

7. (1 point) If the eigenvalues of a matrix are -1, 0 and 4, then its trace and determinant are
   Trace:_____
   Determinant:_____

   Answer: Determinant= product of eigen values
   Trace=sum of eigen values

8. (1 point)

   Answer: To find characteristic polynomial obtain $|A - \lambda I|$

9. (1 point)

   Answer: Solve for λ, $|A - \lambda I| = 0$

10. (1 point)

    Answer: If λ is an eigen value of A then λ^n is eigen value of A^n and vice versa

11. (1 point)

    Answer: A

12. (1 point)

    Answer: B

13. (2 points)

    Answer: 0, 5

14. (2 points)

    Answer: solve $(A - \lambda I)x = 0$, where λ is the eigen value and x is corresponding eigen vector

15. (2 points)

    Answer: Let us consider $P^{-1}AP = B$, Here B is an upper triangular matrix, So the eigenvalues are same as principal diagonal elements. Now, the eigenvalues of B are the eigenvalues of A. So eigenvalues of A^2 are eigenvalues of B squared.

16. (2 points)

    Answer: $$\begin{bmatrix}\theta_0\\ \theta_1\\ \theta_2\end{bmatrix} = \begin{bmatrix}1 & 0 & 0\\ 1 & 1.3 & 1.69\\ 1 & 4 & 16\end{bmatrix}^{-1} \begin{bmatrix}0\\ 1.5\\ 2\end{bmatrix}$$