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Linear algebra

1.

$$5 * 5 + 2 * 2 = 29$$
$$-2 * 5 + 4 * 2 = -2$$

$$\begin{bmatrix} 5 & 2 \\ -2 & 4 \end{bmatrix} \begin{bmatrix} 5 \\ 2 \end{bmatrix} = \begin{bmatrix} 29 \\ -2 \end{bmatrix}$$

2.

“(a) is an inner product, and (b) is an outer product” is TRUE

“(a) is an outer product, and (b) is an inner product” is FALSE

“The output of (a) is a 2 x 2 matrix” is FALSE

“The output of (b) is scalar” is FALSE

3.

“A is symmetric if $A^T = A$ ” is TRUE

“ $A + A = 2A$ ” is TRUE

“If $n \neq m$ then A^{-1} does not exist” is TRUE

“Assuming A^{-1} exists, $AA^{-1} = I$ where I is the identity matrix” is TRUE

4.

FALSE

FALSE

FALSE

TRUE

Algorithms

1.

Time complexity: $O(nm)$

Space complexity: $O(n)$

2.

[-4, 14, 11, -1]

Machine Learning

“Assessing a coin's bias from a single observed coin flip is an example of overfitting” is FALSE

“Overfitting is primarily a concern when training statistical models with large datasets” is FALSE

“Regularization is used to protect against overfitting” is TRUE

“Overfitting to the training data leads to poor generalization on new data points” is TRUE

Calculus and Probability

1.

$$f'(w) = l'(w) + 2\lambda$$

2.

Expected number of successes = $n * p$

3.

$P[X|Y]P[Y] = P[Y|X]P[X]$ is FALSE

$P[X] = P[X|Y]P[Y]$ is FALSE

$P[X,Y] = P[X|Y]P[Y]$ is TRUE

$P[X|Y] = P[X]$ if X and Y are independent is TRUE

4.

Normal = 3.

Binomial = 1.

Uniform = 2.

Bernoulli = 4.