

Advanced Concepts in AI and Machine Learning for Middle School

AI And Machine Learning · Answer Key · 8 Questions

1. In supervised learning, what is the primary role of a 'label' during the training process?

- A) To provide an initial guess for the model's prediction.
- B) To represent the correct output or target value for a given input.**
- C) To randomly assign weights to different features in the dataset.
- D) To define the architecture of the neural network being trained.

2. Which type of machine learning algorithm is commonly used for tasks like spam detection, where the algorithm learns from data with pre-defined categories (spam or not spam)?

- A) Clustering (Unsupervised Learning)
- B) Reinforcement Learning
- C) Regression (Supervised Learning)
- D) Classification (Supervised Learning)**

3. What mathematical concept is fundamental to how many machine learning models, especially neural networks, learn by adjusting their parameters to minimise errors?

- A) Boolean Algebra
- B) Calculus (specifically differentiation and gradients)**
- C) Set Theory
- D) Probability Theory (only for probability distributions)

4. In the context of artificial neural networks, what is the function of an 'activation function'?

- A) To store the input data before processing.
- B) To introduce non-linearity into the output of a neuron.**
- C) To connect neurons across different layers of the network.
- D) To regulate the learning rate of the model.

5. What is the term for when a machine learning model performs very well on the training data but poorly on new, unseen data, often due to learning the training data's noise and specific patterns too closely?

- A) Underfitting
- B) Generalization
- C) Overfitting**
- D) Bias-Variance Tradeoff

6. What is the primary goal of 'feature engineering' in machine learning?

- A) To randomly select data points for the training set.
- B) To create new input variables (features) from raw data that improve model performance.**
- C) To automatically determine the output labels for unsupervised learning.
- D) To reduce the computational power required for model training.

7. Which of the following is an example of 'unsupervised learning'?

- A) Training a model to predict house prices based on historical sales data.
- B) Training a model to identify different breeds of dogs from images.
- C) Grouping customers into segments based on their purchasing behaviour without pre-defined segments.**
- D) Teaching a robot to play a video game through trial and error.

8. What does the term 'model interpretability' refer to in AI and ML?

- A) The speed at which a model can process data.
- B) The ability to understand why a model makes a particular prediction or decision.**
- C) The amount of memory a model requires to run.
- D) The accuracy of the model's predictions on the training set.