

A-Level Computer Science

Name: _____ Score: _____

1. Machine learning means an algorithm that:
 - ☐ learns patterns from data rather than being programmed step by step
 - ☐ is written entirely in assembly
 - ☐ never needs any data
 - ☐ only follows fixed rules
2. Supervised learning uses:
 - ☐ labelled data, learning to map input $\rightarrow$ label
 - ☐ unlabelled data, finding hidden structure
 - ☐ rewards from an environment
 - ☐ no data at all
3. The difference between regression and classification is that regression predicts:
 - ☐ a number, while classification predicts a category
 - ☐ a category, while classification predicts a number
 - ☐ nothing
 - ☐ only true/false
4. In AI, a graph consists of:
 - ☐ nodes (states) joined by edges (moves or relationships)
 - ☐ only a list of numbers
 - ☐ rows and columns of pixels
 - ☐ a single straight line
5. Unsupervised learning is used to:
 - ☐ find structure in unlabelled data, such as clusters
 - ☐ map inputs to known labels
 - ☐ maximise a reward signal
 - ☐ compile code
6. Regression predicts a continuous number (a price, a temperature), while classification predicts a category (cat vs dog).
 - ☐ True ☐ False

7. A neural network is called "deep" when it has many hidden layers, and each neuron takes a weighted sum of its inputs (plus a bias) before applying an activation function.
- ☐ True ☐ False
8. In gradient descent the learning rate sets how big a step each weight update takes — too large overshoots the minimum, too small makes training slow.
- ☐ True ☐ False
9. In reinforcement learning, the agent learns by:
- ☐ trial and error, maximising the total reward over time
 - ☐ reading labelled examples
 - ☐ clustering the data
 - ☐ compiling a program
10. Linear regression chooses its coefficients to:
- ☐ minimise the sum of squared errors against the training data
 - ☐ maximise the number of layers
 - ☐ cluster the data
 - ☐ sort the inputs

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1. learns patterns from data rather than being programmed step by step

ML learns from data; deep learning is ML using multi-layer neural networks.

2. labelled data, learning to map input → label

Supervised learning trains on labelled examples (e.g. images tagged cat/dog).

3. a number, while classification predicts a category

Regression outputs a continuous number (price, temperature); classification outputs a category.

4. nodes (states) joined by edges (moves or relationships)

Graphs model states/places as nodes and moves/relationships as edges — used for pathfinding, game trees and knowledge.

5. find structure in unlabelled data, such as clusters

With no labels, unsupervised learning discovers patterns/clusters in the data.

6. True

Number out = regression; category out = classification — the two main kinds of supervised prediction.

7. True

Stacking many hidden layers lets the network learn richer patterns — training such a network is deep learning.

8. True

Backpropagation finds each weight's gradient; the learning rate scales how far down that gradient the weight moves.

9. trial and error, maximising the total reward over time

The agent tries actions, receives rewards, and learns a policy that maximises long-term reward.

10. minimise the sum of squared errors against the training data

It fits the line/hyperplane that makes the squared differences from the data points as small as possible.