



Scalars, Vectors & Matrices

SCORE

___ / 20

Chapter: AI & Machine Learning · Level ★★★ ·

Time: 30 min

Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

✓ Distinguish scalar/vector/matrix ✓ Shapes and dimensions ✓ Data as matrices ✓ Index elements

**Section A · Concept Check**

• BEGINNER

 $4 \times 1 = 4$

- 1 A single number is a:
☐ A. scalar ☐ B. vector ☐ C. matrix
☐ D. tensor only
- 2 $[3, 1, 4]$ is a:
☐ A. vector ☐ B. scalar ☐ C. matrix ☐ D. set
- 3 A table of numbers rows x cols is a:
☐ A. matrix ☐ B. scalar ☐ C. tuple ☐ D. tree
- 4 A dataset of 100 samples x 5 features is shape:
☐ A. (100, 5) ☐ B. (5, 100) always ☐ C. (500,) ☐ D. (100,)

**Section B · Problem Solving**

• INTERMEDIATE

 $2 + 3 \times 3 = 11$

- 5 A vector has _____ dimension (a list).
- 6 A matrix has rows and _____.
- 7 Give the shape of a 3x2 matrix and write one.

- 8 Why is data stored as matrices for ML?

- 9 Scalar vs vector vs matrix in one line each?

**Section C · Challenge**

• CHALLENGE

5

- 10 What shape is a 28x28 grayscale image?

Reflection — the most useful thing I learned: _____

A ___/4 B ___/11 C ___/5 Total ___/20

Teacher's Signature

Parent's Signature

✂ ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1-A 2-A 3-A 4-A | 5 one 6 columns 7 = (3,2): $[[1,2],[3,4],[5,6]]$ 8 = Vectorised math on whole datasets is fast (GPU/BLAS) 9 = Number; ordered list; grid of numbers | 10 = (28,28) matrix - flattened: 784-vector

