BitWith Bite

MATHEMATICS WORKSHEET

Vector Calculus

Chapter: Multivariable Calculus · Level ★★★ · Time: 30 min

SCORE ___ / 20

Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Distinguish scalar fields from vector fields.
- ✓ Evaluate a vector field at a given point.
- ✓ Recognise the gradient, divergence and curl operations.
- ✓ Give real-world examples of vector fields.

Section A · Concept Check

• BEGINNER 4 × 1 = 4

1 $F(x,y) = (x^2, y^2)$ at (2,1) = ?

○ A. (4, 1) ○ B. (2, 1) ○ C. (1, 4) ○ D. (4, 2)

2 F(x,y) = (3y, −3x) at (1,2) = ?

○ A. (6, −3) ○ B. (3, −1) ○ C. (2, −6) ○ D. (−3, 6)

3 f(x,y) = xy is a:

○ A. vector field ○ B. scalar field ○ C. matrix ○ D. constant

4 F(x,y,z) = (x, y, z) is a:

○ A. scalar field ○ B. vector field ○ C. number ○ D. plane

Section B · Problem Solving

• INTERMEDIATE 2 + 3×3 = 11

5 A _____ field assigns a single number to each point.

6 A _____ field assigns a vector to each point.

7 Given $F(x,y) = (x^2, y^2)$, find F at (2,1).

8 Given F(x,y) = (3y, −3x), find F at (1,2).

9 Is f(x,y) = xy a scalar or vector field?

Section C · Challenge

• CHALLENGE 5

10 Is F(x,y,z) = (x, y, z) a scalar or vector field?

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-B 4-B | 5 scalar 6 vector 7 = (4, 1) 8 = (6, -3) 9 = Scalar field | 10 = Vector field