BitWith Bite

MATHEMATICS WORKSHEET

Divergence

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

SCORE ___ / 20

Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

✓ Compute divergence div F = ∂P/∂x + ∂Q/∂y. ✓ Interpret divergence as a source (spreading) or sink (converging).

✓ Recognise divergence-free (incompressible) fields. ✓ Extend the idea to three-dimensional fields.

Section A · Concept Check • BEGINNER 4 × 1 = 4

1 div F for F = (4x, 5y) = ?

○ A. 4 ○ B. 5 ○ C. 9 ○ D. 20

2 div F for F = (x^2, y^3) = ?

○ A. 2x + 3y 2 ○ B. 2x + y 2 ○ C. x 2 + y 3 ○ D. 5

3 div F for F = (y^2, x^2) = ?

○ A. 0 ○ B. 2x + 2y ○ C. x 2 + y 2 ○ D. 4xy

4 div F for F = (x, y, z) = ?

○ A. 1 ○ B. 2 ○ C. 3 ○ D. 0

Section B · Problem Solving • INTERMEDIATE 2 + 3×3 = 11

5 For F = (P, Q), div F = _____.

6 div F for F = (4x, 5y) = _____.

7 Find the divergence of F = (4x, 5y).

8 Find the divergence of F = (x^2, y^3).

9 Find the divergence of F = (y^2, x^2).

Section C · Challenge • CHALLENGE 5

10 Find the divergence of F = (x, y, z).

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-C 2-A 3-A 4-C | 5 ∂P/∂x + ∂Q/∂y 6 9 7 = 9 8 = $2x + 3y^2$ 9 = 0 | 10 = 3