BitWith Bite

MATHEMATICS WORKSHEET

Implicit Differentiation

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

SCORE ___ / 20

Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Differentiate equations in which y is not isolated.
- ✓ Treat y as a function of x and apply the chain rule to y-terms.
- ✓ Solve the resulting equation for dy/dx.
- ✓ Find slopes of tangents to curves such as circles.

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

1 For $x^2 + y^2 = 49$, dy/dx = ?

○ A. −x/y ○ B. x/y ○ C. −y/x ○ D. y/x

2 Differentiating y^2 with respect to x gives:

○ A. 2y ○ B. 2y·dy/dx ○ C. 2 ○ D. y^2

3 For xy = 20, dy/dx = ?

○ A. y/x ○ B. −y/x ○ C. −x/y ○ D. 1

4 Implicit differentiation is needed when:

○ A. y is isolated ○ B. y cannot easily be isolated ○ C. there is no y ○ D. f is linear

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

5 $d/dx[y^2]$ = _____.

6 For $x^2 + y^2 = 49$, dy/dx = _____.

7 Find dy/dx for $x^2 + y^2 = 49$.

8 Find dy/dx for $x^3 + y^3 = 8$.

9 Find dy/dx for xy = 20.

Section C · Challenge • CHALLENGE 5

10 Find dy/dx for $x^2 - y^2 = 16$.

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-B 3-B 4-B | 5 2y·dy/dx 6 −x/y 7 = −x/y 8 = $-x^2/y^2$ 9 = −y/x | 10 = x/y