



Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Translate a word problem into an objective function. ✓ Use a constraint to reduce the problem to a single variable.
- ✓ Find maxima and minima by solving $f'(x) = 0$. ✓ Check endpoints for absolute extrema.

 Section A · Concept Check • BEGINNER $4 \times 1 = 4$ _____

- 1** A rectangle with perimeter 100 has maximum area with dimensions:
☐ A. 10×40 ☐ B. 25×25 ☐ C. 20×30
☐ D. 50×0
- 2** Two numbers with sum 50 have maximum product when they are:
☐ A. 25 and 25 ☐ B. 10 and 40 ☐ C. 1 and 49
☐ D. 20 and 30
- 3** To optimize, you first set ___ equal to 0:
☐ A. f ☐ B. f' ☐ C. f'' ☐ D. x
- 4** Minimize $C(x) = 2x^2 - 40x + 300$; the minimum is at $x =$
☐ A. 5 ☐ B. 10 ☐ C. 20 ☐ D. 40

 Section B · Problem Solving • INTERMEDIATE $2 + 3 \times 3 = 11$ _____

- 5** Set the first derivative equal to _____ to find critical points.
- 6** A rectangle of fixed perimeter has maximum area when it is a _____.
- 7** A rectangle has perimeter 100. Find the dimensions that maximize area.

- 8** Find two numbers with sum 50 whose product is maximum.

- 9** Minimize $C(x) = 2x^2 - 40x + 300$.

 Section C · Challenge • CHALLENGE 5 _____

- 10** Maximize $P(x) = -x^2 + 12x$.

 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-B 2-A 3-B 4-B | 5 0 6 square 7 = 25 by 25 8 = 25 and 25 9 = Minimum at $x = 10$, $C = 100$ | 10 = Maximum at $x = 6$, $P = 36$