Task card 1 Optimization with Derivatives

A farmer has 60 ft of fencing to make a rectangular pen along a straight river; no fence is needed along the river. What is the largest area the pen can have (in ft²)?

Task card 2 Optimization with Derivatives

A rectangle must have an area of 441 ft². What is the smallest perimeter it can have (in ft)?

Task card 3 Optimization with Derivatives

An open box is made from a 24 in by 24 in sheet of cardboard by cutting equal squares from the corners and folding up the sides. What is the largest possible volume (in in³)?

Task card 4 Optimization with Derivatives

Two positive numbers add up to 52. What is the largest possible value of their product?

Task card 5 Optimization with Derivatives

A company's profit from selling x items is $P(x) = -2x^2 + 80x - 350$ dollars. What is the largest possible profit?

Task card 6 Optimization with Derivatives

Two positive numbers multiply to 256. What is the smallest possible value of their sum?

Task card 7 Optimization with Derivatives

A farmer has 104 ft of fencing to make a rectangular pen along a straight river; no fence is needed along the river. What is the largest area the pen can have (in ft^2)?

Task card 8 Optimization with Derivatives

A farmer has 160 ft of fencing to make a rectangular pen along a straight river; no fence is needed along the river. What is the largest area the pen can have (in ft^2)?

Task card 9 Optimization with Derivatives

An open box is made from a 30 in by 30 in sheet of cardboard by cutting equal squares from the corners and folding up the sides. What is the largest possible volume (in in^3)?

Task card 10 Optimization with Derivatives

An open-top box with a square base must hold 1372 cm^3. What is the least amount of material (surface area in cm^2) it can use?

Task card 11 Optimization with Derivatives

A rectangular garden of 150 ft^2 is fenced on all four sides. The fence along the front costs $8 per foot and the other three sides cost $4 per foot. What is the least possible cost of the fence (in dollars)?

Task card 12 Optimization with Derivatives

Two positive numbers x and y add up to 6. What is the largest possible value of $x \cdot y^2$?

Task card 13 Optimization with Derivatives

A farmer has 152 ft of fencing to make a rectangular pen along a straight river; no fence is needed along the river. What is the largest area the pen can have (in ft^2)?

Task card 14 Optimization with Derivatives

An open box is made from a 5 in by 8 in sheet of cardboard by cutting equal squares from the corners and folding up the sides. What is the largest possible volume (in in^3)?

Task card 15 Optimization with Derivatives

An open box is made from a 24 in by 24 in sheet of cardboard by cutting equal squares from the corners and folding up the sides. What side length of square should be cut to make the volume as large as possible?

Task card 16 Optimization with Derivatives

An open box is made from a 9 in by 24 in sheet of cardboard by cutting equal squares from the corners and folding up the sides. What side length of square should be cut to make the volume as large as possible?

Task card 17 Optimization with Derivatives

An open-top box with a square base must hold 108 cm^3. What is the least amount of material (surface area in cm^2) it can use?

Task card 18 Optimization with Derivatives

A rectangular garden of 432 ft^2 is fenced on all four sides. The fence along the front costs \$3 per foot and the other three sides cost \$6 per foot. What is the least possible cost of the fence (in dollars)?

Task card 19 Optimization with Derivatives

Two positive numbers x and y add up to 18. What is the largest possible value of $x \cdot y^2$?

Task card 20 Optimization with Derivatives

A farmer has 56 ft of fencing to make a rectangular pen along a straight river; no fence is needed along the river. What is the largest area the pen can have (in ft^2)?

Task card 21 Optimization with Derivatives

An open box is made from a 5 in by 8 in sheet of cardboard by cutting equal squares from the corners and folding up the sides. What side length of square should be cut to make the volume as large as possible?

Task card 22 Optimization with Derivatives

An open box is made from an 18 in by 18 in sheet of cardboard by cutting equal squares from the corners and folding up the sides. What side length of square should be cut to make the volume as large as possible?

Task card 23 Optimization with Derivatives

A rectangular garden of 720 ft^2 is fenced on all four sides. The fence along the front costs $3 per foot and the other three sides cost $2 per foot. What is the least possible cost of the fence (in dollars)?

Task card 24 Optimization with Derivatives

A farmer has 100 ft of fencing to make a rectangular pen along a straight river; no fence is needed along the river. What is the largest area the pen can have (in ft^2)?

Optimization with Derivatives Task Cards

Recording sheet · Grade 12 · Give just the number asked for, with no units or $ sign. Every answer is a whole number.

Name: _____ Date: _____

Scan to check your answers

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24

Optimization with Derivatives Task Cards: Answer Key

Grade 12 · Medium

The answers online

1. 450	**2.** 84	**3.** 1024
4. 676	**5.** 450	**6.** 32
7. 1352	**8.** 3200	**9.** 2000
10. 588	**11.** 240	**12.** 32
13. 2888	**14.** 18	**15.** 4
16. 2	**17.** 108	**18.** 432
19. 864	**20.** 392	**21.** 1
22. 3	**23.** 240	**24.** 1250