

19. Consider the following problem: Find two numbers whose sum is 19 and whose product is as large as possible.

- (a) Experiment with the problem by making a table like the one below, showing the product of different pairs of numbers that add up to 19. Based on the evidence in your table, estimate the answer to the problem.

First number	Second number	Product
1	18	18
2	17	34
3	16	48
\vdots	\vdots	\vdots

(b) Find a function that models the product in terms of one of the two numbers.

(c) Use your model to solve the problem, and compare with your answer to part (a).

20. Find two positive numbers whose sum is 100 and the sum of whose squares is a minimum.

21. Find two numbers whose sum is -24 and whose product is a maximum.

22. Among all rectangles that have a perimeter of 20 ft, find the dimensions of the one with the largest area.

23. Consider the following problem: A farmer has 2400 ft of fencing and wants to fence off a rectangular field that borders a straight river. He does not need a fence along the river. (See the figure.) What are the dimensions of the field of largest area that he can fence?

(a) Experiment with the problem by drawing several diagrams illustrating the situation, as in Example 2. Calculate the area of each configuration, and use your results to estimate the dimensions of the largest possible field.

(b) Find a function that models the area of the field in terms of one of its sides.

(c) Use your model to solve the problem, and compare with your answer to part (a).

