

1. Find two numbers whose difference is 100 and whose product is a minimum.

Answers:
50 & -50

2. Find two positive numbers whose product is 100 and whose sum is a minimum.

10 & 10

3. The sum of two positive numbers is 16. What is the smallest possible value of the sum of their squares?

8 & 8

4. Find the dimensions of a rectangle with perimeter 100 m whose area is as large as possible.

25 & 25

5. Find the dimensions of a rectangle with area 1000 m^2 whose perimeter is as small as possible.

$10\sqrt{10}$ & $10\sqrt{10}$

6. A farmer wants to fence an area of 1.5 million square feet in a rectangular field and then divide it in half with a fence parallel to one of the sides of the rectangle. How can he do this so as to minimize the cost of the fence?

Answers:
1500 & 1000

7. Find the point on the line $y = 2x + 3$ that is closest to the origin.

$\left(-\frac{6}{5}, \frac{3}{5}\right)$

8. Find the point on the curve $y = \sqrt{x}$ that is closest to the point (3,0).

$\left(\frac{5}{2}, \sqrt{\frac{5}{2}}\right)$

9. Find the points on the ellipse $4x^2 + y^2 = 4$ that are furthest away from the point (1,0).

$\left(-\frac{1}{3}, \pm \frac{4\sqrt{2}}{3}\right)$