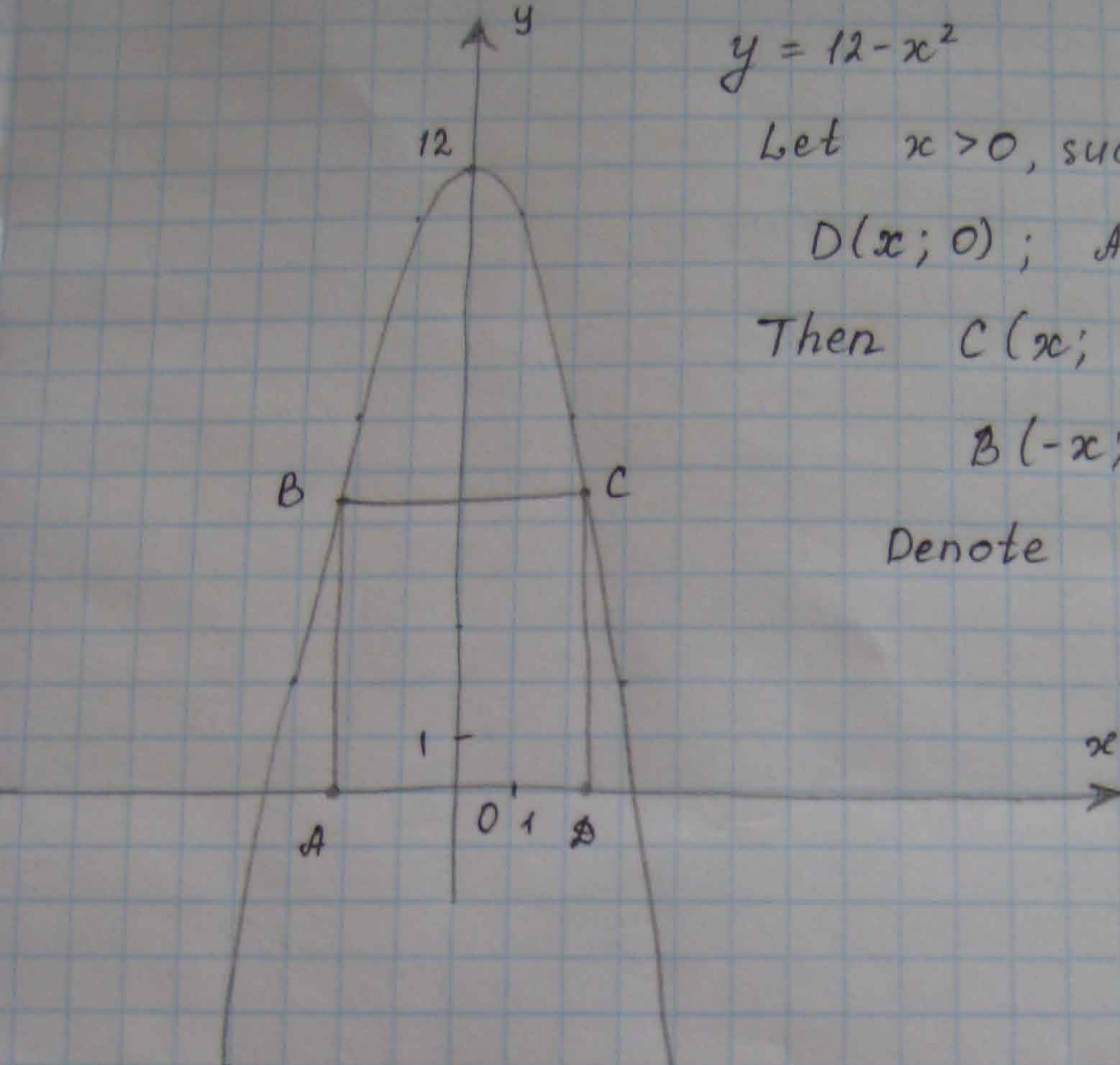
Solution



$y = 12 - x^2$

Let $x > 0$, such that

$D(x; 0)$; $A(-x; 0)$.

Then $C(x; 12-x^2)$ and

$B(-x; 12-x^2)$

Denote $a = AD$, $b = CD$

$a = \sqrt{(x-(-x))^2 + (0-0)^2} = \sqrt{4x^2} = 2x$

$b = \sqrt{(x-x)^2 + (12-x^2-0)^2} = \sqrt{(12-x^2)^2} = 12-x^2$

The area of the rectangle $S = a \cdot b = 2x \cdot (12-x^2) = 24x - 2x^3$

$S' = 24 - 6x^2$

When $S' = 0$, then $24 - 6x^2 = 0$

$x^2 = 4$

$\boxed{x = 2}$ or $x = -2$ $(x > 0)$

S' + −

S ↗ 2 ↘ x

$x = 2$ - point of maximum

Therefore,

$a = 2x = 2 \cdot 2$ - width

$b = 12 - x^2 = 12 - 4 = 8$ - length

$S = a \cdot b = 4 \cdot 8 = 32$ - maximum area