

Answer on Question #56981 – Math – Analytic Geometry

Question

Find the equations of the chords of the parabola $y^2 = 4ax$ which pass through the point $(-6a, 0)$ and which subtends an angle of 45° at the vertex.

Solution

The vertex of parabola

$$y^2 = 4ax$$

is $(0,0)$.

Equation of a chord in the slope-intercept form is

$$y=kx+b \tag{1}$$

Here $k=\tan 45^\circ=1$, because a chord subtends an angle of 45° at the vertex.

So, in fact (1) is given by

$$y=x+b \tag{2}$$

On the other hand, this line passes through the point $(-6a, 0)$, consequently its coordinates satisfy equation (2):

$$0=-6a+b,$$

$$b=6a.$$

Finally, $y=x+6a$ is the equation of chord.

Answer: $y=x+6a$.