Answer on Question #40076 - Math – Geometry Assignment

Write the equation of the parabola with (5,-8) and (5,-1)

Solution

It is impossible to solve this problem, if we do not know additional assumptions.
Suppose that it is parabola with *vertical* axis of symmetry

$$y = ax^2 + bx + c$$

Points (5,-8) and (5,-1) satisfy this equation

$$-8 = 25a + 5b + c$$
$$-1 = 25a + 5b + c$$

This system has no solution, so consider the second case.

Suppose that it is parabola with *horizontal* axis of symmetry

$$x = ay^2 + by + c$$

Points (5,-8) and (5,-1) satisfy this equation

$$5 = 64a - 8b + c$$
$$5 = a - b + c$$

Subtract the second equation from the first one and get $63a - 7b = 0,\ 9a - b = 0$ or $b = 9a$.
Substitute $b = 9a$ into equations of the system

$$5 = 64a - 72a + c$$
$$5 = a - 9a + c$$

or

$$5 = -8a + c$$
$$5 = -8a + c$$

Finally
$c = 5 + 8a$, $b = 9a$.
Thus, we search an equation

$$x = ay^2 + by + c$$

In the form

$$x = ay^2 + 9ay + 8a + 5$$

To find *a, b, c*, we need more information.