

## Answer on Question #77878 – Math – Algebra

### Question

Prove algebraically that the straight line with equation  $x=2y+5$  is a tangent to the circle with equation  $x^2+y^2=5$ .

### Solution

The line could be tangent to the circle only if we have one solution of the system (we will have the intersection of the graphs at the one point):

$$\begin{cases} x = 2y + 5 \\ x^2 + y^2 = 5 \end{cases}$$

Substitute:

$$(2y + 5)^2 + y^2 = 5$$

$$4y^2 + 20y + 25 + y^2 = 5$$

$$5y^2 + 20y + 20 = 0$$

$$D = 20^2 - 4 * 5 * 20 = 400 - 400 = 0$$

So we have only one 'y':

$$y = y_1 = y_2 = -\frac{b}{2a} = -\frac{20}{2 * 5} = -2$$

Substitute 'y' to 'x=2y+5':

$$x = 2 * (-2) + 5 = -4 + 5 = 1$$

So tangent point is (1; -2).