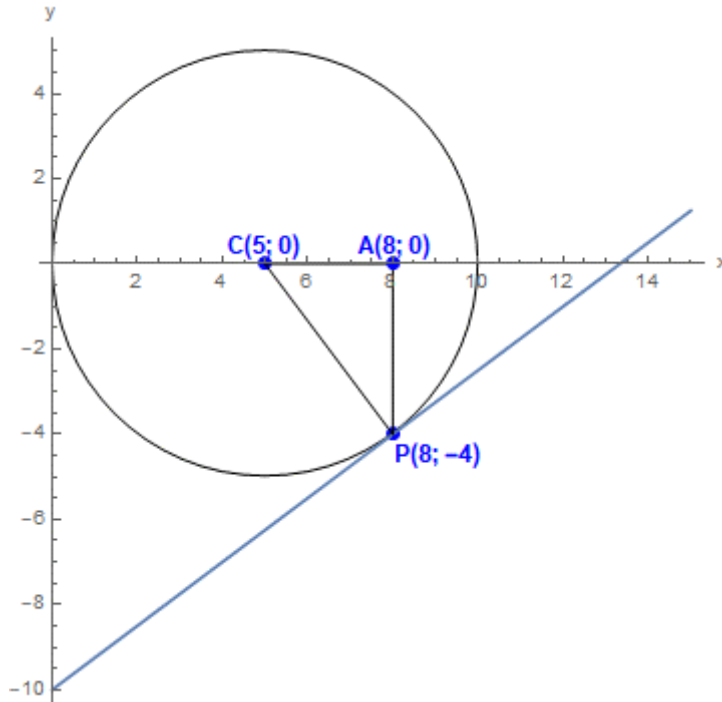


Answer on Question #76986 – Math – Calculus

Question

Let C denote the circle whose equation is $(x - 5)^2 + y^2 = 25$. Notice that the point $(8; -4)$ lies on the circle C. Find the equation of the line that is tangent to C at the point $(8; -4)$.

Solution



$$\text{Gradient of } CP = \frac{\text{rise}}{\text{run}} = \left[\begin{array}{l} \text{rise} = |PA| = -4 \\ \text{run} = |AC| = 8 - 5 = 3 \end{array} \right] = -\frac{4}{3}$$

$$\text{Gradient of the tangent} = -\frac{1}{\text{Gradient of } CP} = \frac{3}{4}$$

Equation of a straight line: $y = mx + c$

$$m = \text{gradient of the tangent} = \frac{3}{4} \rightarrow y = \frac{3}{4}x + c$$

$$\text{A line goes through the point } (8; -4) \rightarrow c = y - \frac{3}{4}x = -4 - \frac{3}{4} \cdot 8 = -10$$

Answer:

The equation of the line that is tangent to C at the point $(8; -4)$ is

$$y = \frac{3}{4}x - 10$$