Assignment - 11.10.2.8

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CONTENTS

I. PROBLEM

The perpendicular distance from the origin is 5 units and the angle made by the perpendicular with the positive x-axis is $30°$.Find the equation of the line ?

II. SOLUTION

$$\mathbf{m} = \tan 30^\circ \tag{1}$$

$$\mathbf{m} = \begin{pmatrix} 1 \\ \frac{1}{\sqrt{3}} \end{pmatrix} \tag{2}$$

$$d = \frac{|\mathbf{c}|}{\|\mathbf{m}\|} \tag{3}$$

$$\mathbf{c} = \frac{10}{\sqrt{3}} \tag{4}$$

Equation

$$\mathbf{m}^\top \mathbf{X} = \mathbf{c} \tag{5}$$

$$\begin{pmatrix} 1 & \frac{1}{\sqrt{3}} \end{pmatrix} \mathbf{X} = \frac{10}{\sqrt{3}} \tag{6}$$

$$\begin{pmatrix} \sqrt{3} & 1 \end{pmatrix} \mathbf{X} = 10 \tag{7}$$

$$\sqrt{3}\mathbf{x} + \mathbf{y} = 10 \tag{8}$$