Assignment 1

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Find Python Codes from below link

svn co https://github.com/SiddharthPh/Summer2020/trunk/geometry/LinearAlgebra/codes

and latex-tikz codes from

svn co https://github.com/SiddharthPh/Summer2020/trunk/geometry/LinearAlgebra/figs

1 Examples 1

Question 1

Find the value of x_1 if the distance between the points $(x_1, 2)$ and $(3, 4)$ be 8

$$\begin{pmatrix} x_1 \\ 2 \end{pmatrix}, \begin{pmatrix} 3 \\ 4 \end{pmatrix} \tag{1.0.1}$$

1.1 Solution

The distance between two vectors is given by

$$\|\mathbf{A} - \mathbf{B}\| \tag{1.1.1}$$

$$\left\| \begin{pmatrix} x_1 \\ 2 \end{pmatrix} - \begin{pmatrix} 3 \\ 4 \end{pmatrix} \right\| = 8 \tag{1.1.2}$$

$$\left\| \begin{pmatrix} x_1 - 3 \\ -2 \end{pmatrix} \right\| = 8 \tag{1.1.3}$$

$$\sqrt{\left(x_1 - 3\right)^2 + \left(-2\right)^2} = 8 \tag{1.1.4}$$

$$\left(x_1 - 3\right)^2 + \left(-2\right)^2 = 8^2 \tag{1.1.5}$$

$$x_1^2 - 6x_1 + 9 + 4 = 64 \tag{1.1.6}$$

$$= x_1^2 - 6x_1 - 51 \tag{1.1.7}$$

On solving for x_1 in above quadratic equation

$$\implies x_1 = 3 + 2\sqrt{15}, x_1 = 3 - 2\sqrt{15} \tag{1.1.8}$$

$$\implies x_1 = 10.745, x_1 = -4.745 \tag{1.1.9}$$

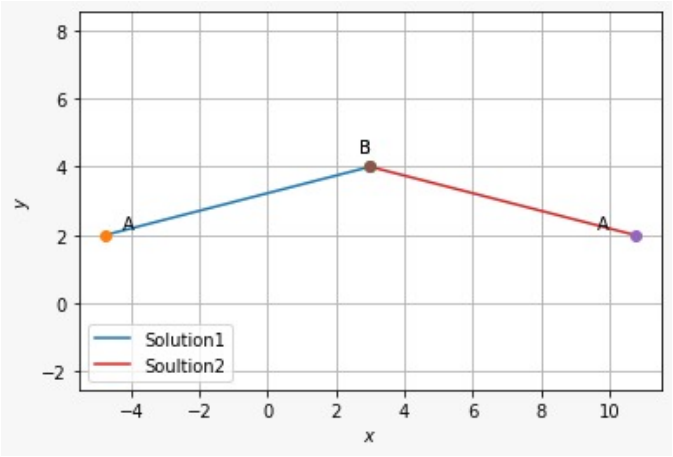

Fig. 0