Assignment 1

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Download all python codes from

https://github.com/cars3/Ex-2.5_Isoceles_triangle/blob/main/Diagram%20for%20Ex-2.5.py

and latex-tikz codes from

https://github.com/cars3/Ex-2.5_Isoceles_triangle/

1 Problem

(vectors 2.5) Are the following points from the vertices of Isoceles triangle?

$$\mathbf{A} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 6 \\ 4 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 7 \\ -2 \end{pmatrix} \tag{1.0.1}$$

2 Solution

With the given points

$$\mathbf{A} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 6 \\ 4 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 7 \\ -2 \end{pmatrix}$$

To find out whether the triangle formed is an isoceles triangle the distance formula can be used, the formula is -

For 2 points M = (x_1, y_1) and N =(x_2, y_2)
$\overline{\text{MN}} = \sqrt{(x_2 - x_1)^2 - (y_2 - y_1)^2}$

Now applying this formula on the triangle
$AB = \sqrt{(6-5)^2 - (4-(-2))^2} = \sqrt{(1)^2 - (6)^2} = \sqrt{35}$
(not -35, as distance will always be in positive)
$BC = \sqrt{(7-6)^2 - (-2) - 4)^2} = \sqrt{(1)^2 - (-6)^2} = \sqrt{35}$
$AC = \sqrt{(7-5)^2 - ((-2)-(-2))^2} = \sqrt{4} = 2$

After the application of the formula, it can be understood that $\overline{\text{AB}} = \overline{\text{BC}}$

With this we can understand that the $\triangle ABC$ is an Isosceles triangle The triangle $\triangle ABC$ is shown in Fig0