

ASSIGNMENT-2

T.Naveena

Download all python codes from

<https://github.com/ThurpuNaveena/ASSIGNMENT-2/tree/main/CODES>

and latex-tikz codes from

<https://github.com/ThurpuNaveena/ASSIGNMENT-2/tree/main>

1 QUESTION NO-2.14

Find the equation of the line satisfying the following conditions

- 1) Intersecting the x-axis at a distance of 3 units to the left of the origin with slope -2.
- 2) Intersecting the y-axis at a distance of 2 units above the origin and making an angle of 30° with the positive direction of the x-axis.

2 SOLUTION

1) Let line AB intersect the x-axis at a distance 3 units to the left of origin. At x-axis, y is always 0.

$$y - y_0 = m(x - x_0) \quad (2.0.1)$$

$$y - 0 = -2(x - 3) \quad (2.0.2)$$

$$y = -2x + 6 \quad (2.0.3)$$

$$y + 2x = 6 \quad (2.0.4)$$

$$(2 \ 1)x = 6 \quad (2.0.5)$$

$$A = \begin{pmatrix} 3 \\ 0 \end{pmatrix}, B = \begin{pmatrix} 0 \\ 6 \end{pmatrix} \quad (2.0.6)$$

Plot of the line AB

2) Line AB intersects the y-axis 2 units above origin. As we know that at y-axis, x-coordinate will be 0 always.

Also line AB makes an angle of 30° with the x-axis.

$$\text{slope of the line} = \tan 30^\circ = m = \frac{1}{\sqrt{3}}.$$

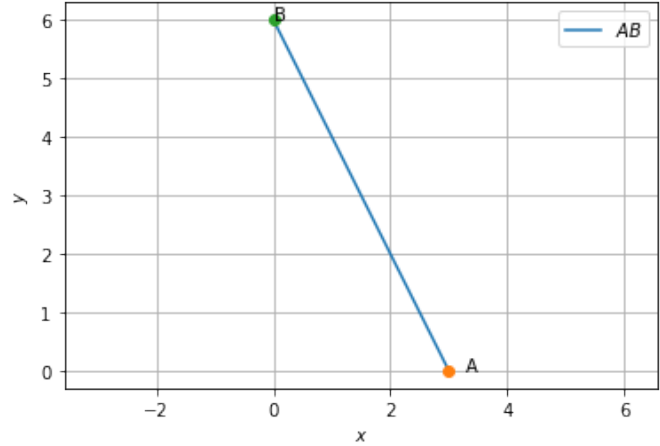


Fig. 2.1: Plot of Line AB (Part-1)

$$y - y_0 = m(x - x_0) \quad (2.0.7)$$

$$y - 2 = \frac{1}{\sqrt{3}}x \quad (2.0.8)$$

$$y = \frac{1}{\sqrt{3}}x + 2 \quad (2.0.9)$$

$$y = \frac{x + 2\sqrt{3}}{\sqrt{3}} \quad (2.0.10)$$

$$\sqrt{3}y = x + 2\sqrt{3} \quad (2.0.11)$$

$$\sqrt{3}y - x = 2\sqrt{3} \quad (2.0.12)$$

$$(-1 \ \sqrt{3})x = 2\sqrt{3} \quad (2.0.13)$$

$$A = \begin{pmatrix} -2\sqrt{3} \\ 0 \end{pmatrix}, B = \begin{pmatrix} 0 \\ 2 \end{pmatrix} \quad (2.0.14)$$

Plot of the line AB

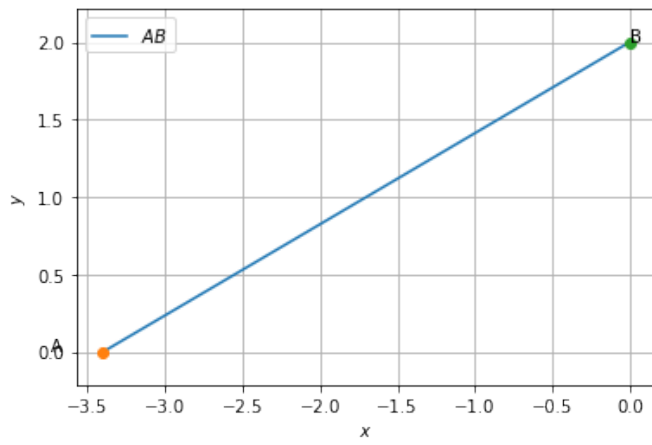


Fig. 2.2: Plot of Line AB (Part-2)