# 1.9.1

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**Question**:
The distance between the points $(m, -n)$ and $(-m, n)$ is _____.
**Solution:** let **A** and **B** be the vectors such that:

| Variable | value |
|---|---|
| $A$ | $\begin{pmatrix} m \\ -n \end{pmatrix}$ |
| $B$ | $\begin{pmatrix} -m \\ n \end{pmatrix}$ |

TABLE 0: Variables used

Distance between **A** and **B** or Norm of **A** - **B** is:

$$\begin{aligned} \|\mathbf{A}-\mathbf{B}\| &= \sqrt{\|\mathbf{A}\|^2 + \|\mathbf{B}\|^2 - 2A^\top \mathbf{B}} \\ &= \sqrt{(m^2+n^2) - 2(-m^2-n^2) + m^2 + n^2} \\ &= \sqrt{4(m^2+n^2)} \\ &= 2\sqrt{m^2+n^2} \end{aligned}$$

Hence Distance between **A** and **B** is $2\sqrt{m^2+n^2}$.

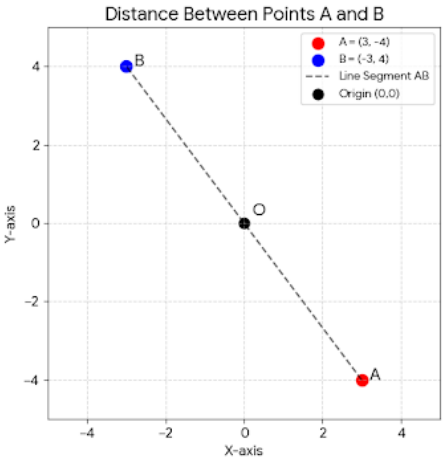


Fig. 0.1: Plot