

# Matgeo - 1-1.2-19

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**Question:** Find the slope of lines

- 1) Passing through the points  $(3, -2)$  and  $(-1, 4)$
- 2) Passing through the points  $(3, -2)$  and  $(7, -2)$
- 3) Passing through the points  $(3, -2)$  and  $(3, 4)$
- 4) Making inclination of  $60^\circ$  with the positive direction of x-axis.

**Solution:**

1)

$$m = B - A = \begin{pmatrix} 3 \\ -2 \end{pmatrix} - \begin{pmatrix} -1 \\ 4 \end{pmatrix} \quad (1.1)$$

$$= \begin{pmatrix} 4 \\ -6 \end{pmatrix} \quad (1.2)$$

$$= 4 \begin{pmatrix} 1 \\ -\frac{3}{2} \end{pmatrix} \quad (1.3)$$

$\therefore$  slope is  $\frac{3}{2}$

2)

$$m = B - A = \begin{pmatrix} 3 \\ -2 \end{pmatrix} - \begin{pmatrix} 7 \\ -2 \end{pmatrix} \quad (2.1)$$

$$= \begin{pmatrix} -4 \\ 0 \end{pmatrix} \quad (2.2)$$

$$= -4 \begin{pmatrix} 1 \\ 0 \end{pmatrix} \quad (2.3)$$

$\therefore$  slope is 0

3)

$$m = B - A = \begin{pmatrix} 3 \\ -2 \end{pmatrix} - \begin{pmatrix} 3 \\ 4 \end{pmatrix} \quad (3.1)$$

$$= \begin{pmatrix} 0 \\ -6 \end{pmatrix} \quad (3.2)$$

$$= 6 \begin{pmatrix} 0 \\ -1 \end{pmatrix} \quad (3.3)$$

$\therefore$  slope is  $-\infty$

4)

$$m = \begin{pmatrix} \cos \alpha \\ \sin \alpha \end{pmatrix} \quad (4.1)$$

$$= \begin{pmatrix} \cos 60^\circ \\ \sin 60^\circ \end{pmatrix} \quad (4.2)$$

$$= \begin{pmatrix} \frac{1}{2} \\ \frac{\sqrt{3}}{2} \end{pmatrix} \quad (4.3)$$

$$= \frac{1}{2} \begin{pmatrix} 1 \\ \sqrt{3} \end{pmatrix} \quad (4.4)$$

$\therefore$  slope is  $\sqrt{3}$

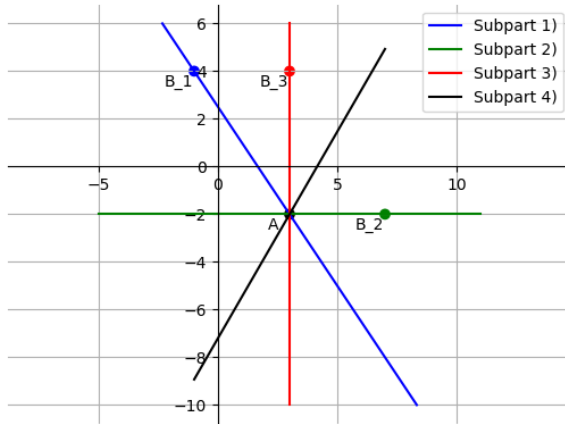


Fig. 4: A plot of all lines

Code for plotting points and vector arithmetic

Codes/linear.py