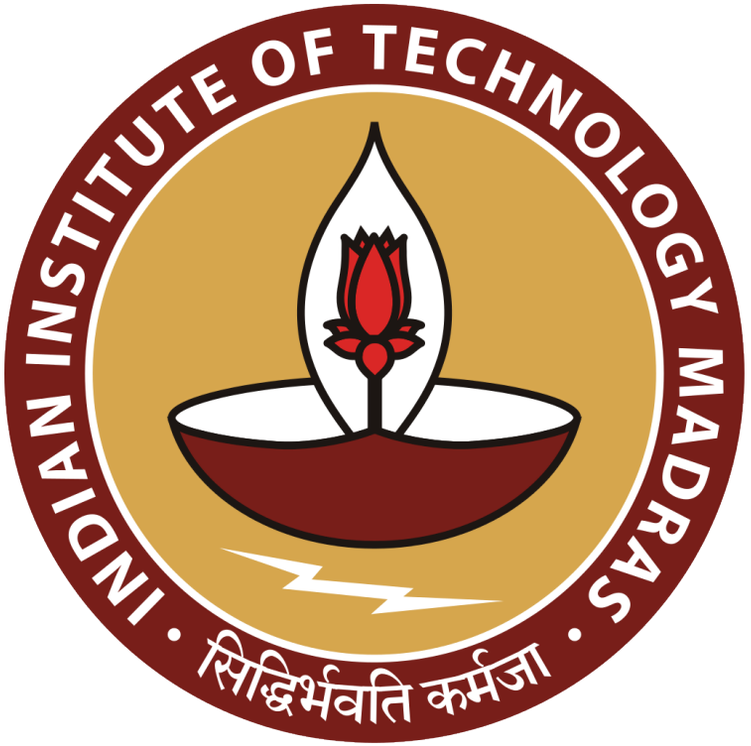
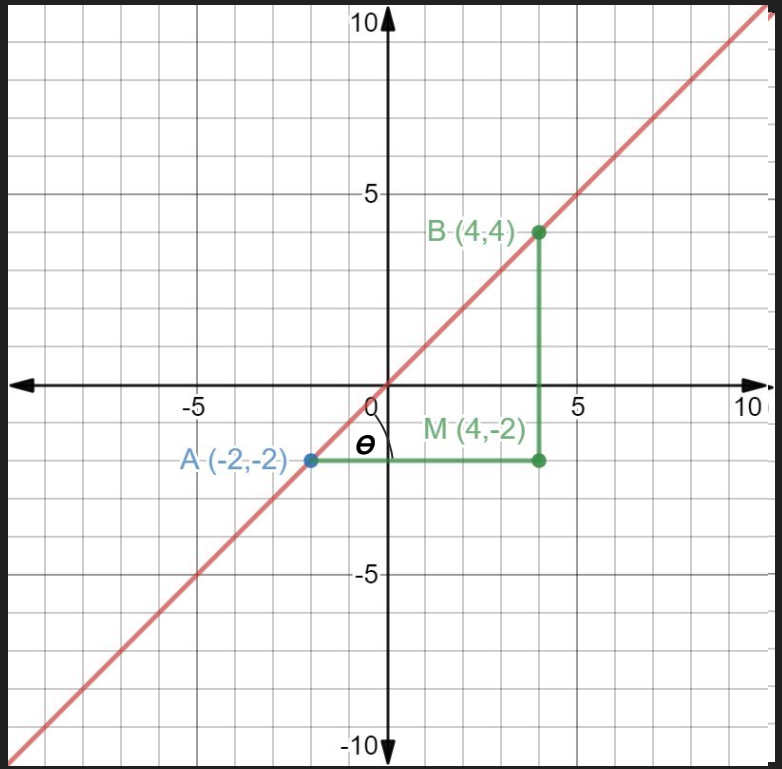


IIT Madras

ONLINE DEGREE

Slope of a Line



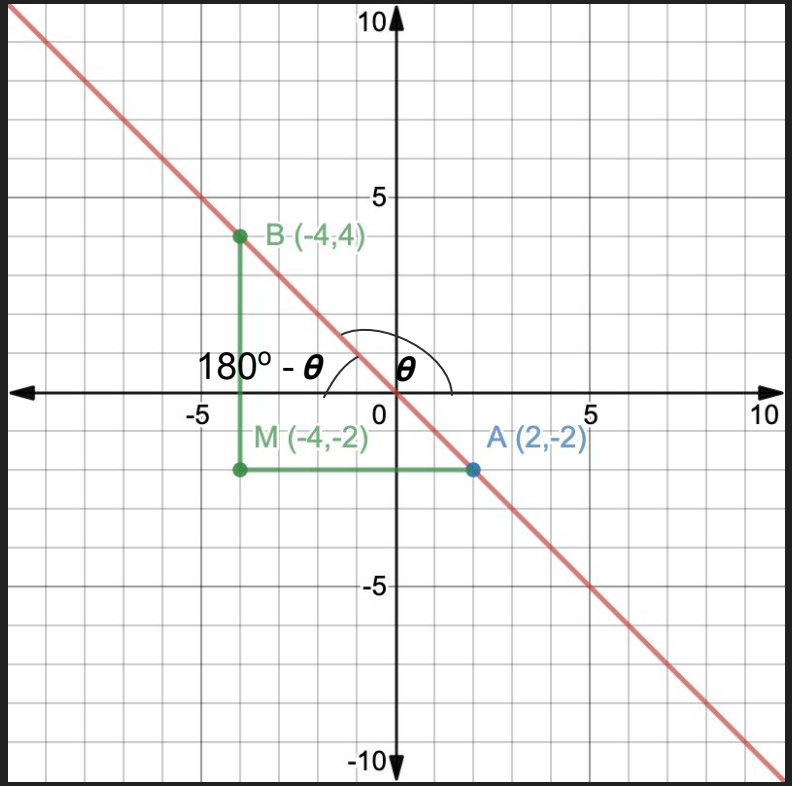
Goal: To find the slope of a line, given on a coordinate plane.

- Identify two points on the line, say, A (x_1, y_1) and B (x_2,y_2).
- Construct a right angled triangle with a right angle at the Point M (x_2, y_1).
- Define

$$m = \frac{MB}{AM} = \frac{y_1 - y_2}{x_1 - x_2} = \tan\theta.$$

- The *m* is called slope of a line.
- ***θ*** is called the inclination of the line with positive X-axis, measured in anticlockwise direction.
- $0^o \leq \theta \leq 180^o$

Slope of a line (Continued)



- Observe that the lines parallel to X-axis have inclination of 0°. Hence the slope m = tan 0 = 0.
- The inclination of a vertical line is 90°. Hence, the slope m is undefined.

Definition: If θ is the inclination of a line l, then tanθ is called the slope or gradient of line l.

If $\theta \neq 90^\circ$, then m = tanθ.

$$m = \tan(180 - \theta) = -\tan\theta = \frac{y_1 - y_2}{x_1 - x_2}.$$