

Slope Calculations

Video Notes

The Questions

- What is meant by slope?
- And how is the slope calculated?

What is Slope?

Slope:

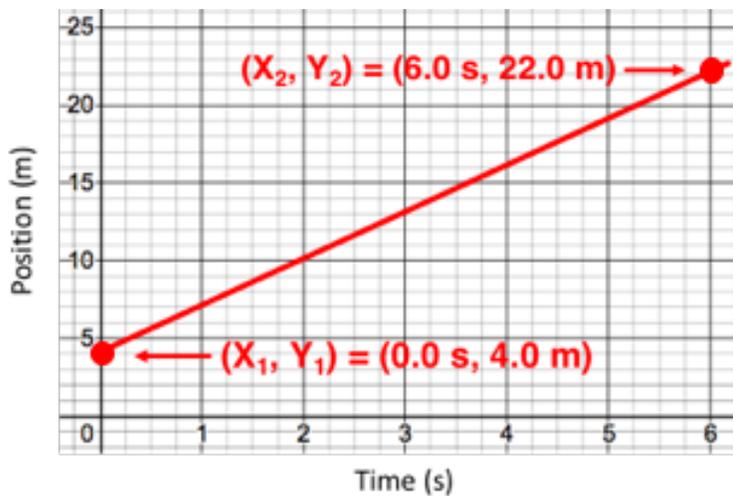
- how steep a line is
- the ratio of the Rise per Run

$$\text{Slope} = \frac{\text{Rise}}{\text{Run}} = \frac{\Delta Y}{\Delta X}$$

Five Simple Steps to Calculating the Slope:

1. Identify the coordinates of two points that are on the line.
2. Write the coordinates down in (X, Y) format.
3. Calculate the Rise or the change in the Y-coordinate value.
4. Calculate the Run or the change in the X-coordinate value.
5. Calculate the slope by dividing the ΔY by the ΔX .

Example



$$\begin{aligned} \text{Rise} = \Delta Y &= Y_2 - Y_1 = \\ &= 22.0 \text{ m} - 4.0 \text{ m} = 18.0 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{Run} = \Delta X &= X_2 - X_1 = \\ &= 6.0 \text{ s} - 0.0 \text{ s} = 6.0 \text{ s} \end{aligned}$$

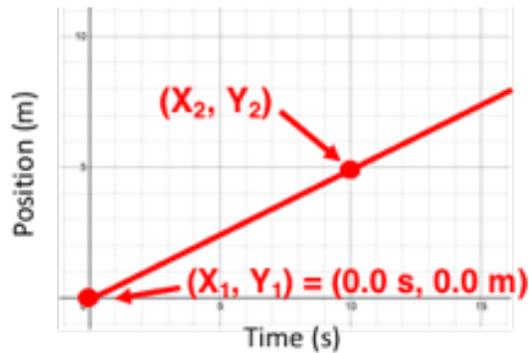
$$\begin{aligned} \text{Slope} = \text{Rise/Run} &= \\ &= 18.0 \text{ m} / 6.0 \text{ s} = \mathbf{3.0 \text{ m/s}} \end{aligned}$$

Show your work.
Show your answer.
Show your unit.
Show you're great

Two Warnings

Warning #1

For lines that pass through the origin, select (0, 0) as one of your two points (referring to Step 1 of the 5-step process). The result is that the slope becomes Y_2/X_2 . But that's only because one of the points is (0, 0).



$$\Delta Y = Y_2 - Y_1 = Y_2 - 0 = Y_2$$

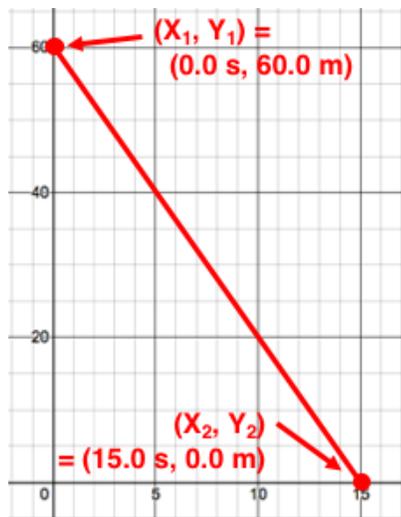
$$\Delta X = X_2 - X_1 = X_2 - 0 = X_2$$

$$\text{Slope} = \frac{\Delta Y}{\Delta X} = \frac{Y_2}{X_2}$$

Slope isn't always Y_2/X_2 . **Slope is always $\Delta Y/\Delta X$.**

Warning #2

Downward sloping lines have negative slope. Always! If your calculation results in a positive value for slope, you have done something wrong. Review your work and fix it.



$$\Delta Y = Y_2 - Y_1 = 0.0 \text{ m} - 60.0 \text{ m}$$
$$\Delta Y = -60.0 \text{ m}$$

$$\Delta X = X_2 - X_1 = 15.0 \text{ s} - 0.0 \text{ s}$$
$$\Delta X = 15.0 \text{ s}$$

$$\text{Slope} = \frac{\Delta Y}{\Delta X} = \frac{-60.0 \text{ m}}{15.0 \text{ s}}$$

$$\text{Slope} = -4.0 \text{ m/s}$$