



## FORM 4 SPM PHYSICS SHORTHAND NOTES

### Chapter 1 Measurement

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#### 1.1 Physical Quantities

A physical quantity is a quantity that can be measured. They consist of **base quantities** and **derived quantities**.

**Base quantities** are physical quantities that **cannot be defined in terms of other quantities** (think a single block in Minecraft)

**Derived quantities** are physical quantities **derived from combinations of base quantities** (think the house you build out of many blocks!)

**SI Units** or International System of Units, will be used in our syllabus to define the quantities.

#### Length and Time

Length is a **base quantity**. A ruler measures **length** for distances between 1 mm (not SI) and 1 meter.

SI unit: meters (m)

Volume is an example of a **derived quantity**. To measure the volume of a regular object, you will need to know the formula and its lengths. E.g. to measure the volume of a solid box, you'll need its height x length x width. The SI units for volume is, therefore, meters x meters x meters or m<sup>3</sup>.

**Time** is measured using clocks.

SI unit: seconds (s)

#### 1.2 Scientific Investigation

Recall from mathematics the gradient,  $m$ , of a graph, is given by

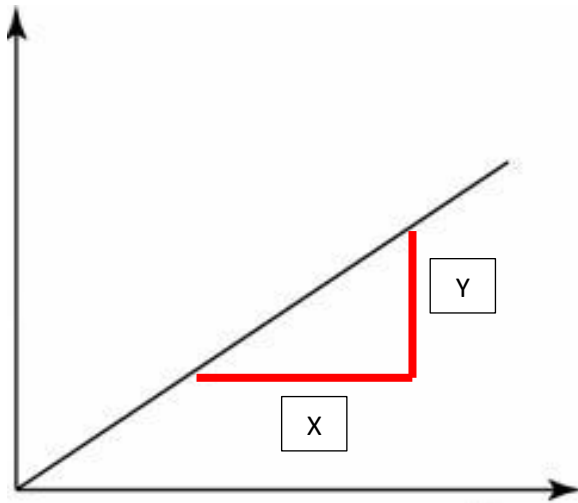
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Graphically, you can use the triangular method to find the gradient of a curve. The steps are shown below:

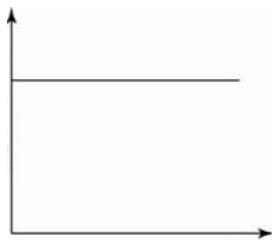
- 1) Draw a "triangle on the curve"
- 2) Take the height of the triangle  $Y$  and divide it by  $X$  to find the gradient

$$m = \frac{Y}{X}$$

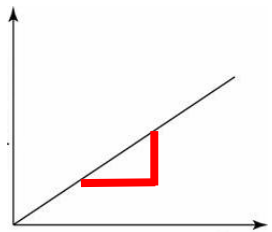




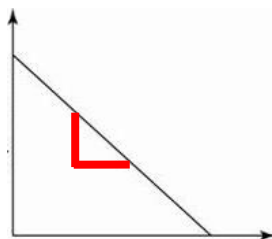
In physics SPM, you must recognize the **five** types of gradients or “curves” in a graph



$m=0$   
No gradient



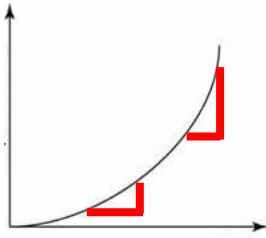
$m>0$   
A constant and positive curve



$m<0$   
A constant and negative curve

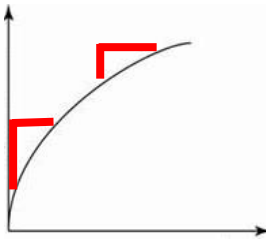


# Senpai Corner



m is increasing

The gradient increases as you move further along the curve, causing the triangle to become steeper.



m is decreasing

The gradient decreases as you move further along the curve, causing the triangle to become less steep.