

Mathematical Skills for Physics 0625

Part 1: Determining Significant Figures

Prepared by: Adiyu Mohamed | adiyu.muhammad@gmail.com | Telegram: @AdiyuMuhammad

The syllabus requirements:

- (1) Use decimal places and significant figures appropriately
- Mathematical requirements, page 50-
- (2) The number of significant figures given for measured quantities should be appropriate to the measuring instrument used.
- (3) The number of significant figures given for calculated quantities should be the same as the least number of significant figures in the raw data used in that specific question.
- Presentation of data, page 51-

This means that when answering a question by using calculations, the student has to look at the raw data available in the question. Then the student should identify the least number of significant figures used in it. This same number of significant figures should be used in the student's answer. Usually, in physics (0625) papers, these are two significant figures. Sometimes, the question may ask for an answer in other significant figures or a certain number of decimal places.

The use of significant figures in physics:

- Significant figures = the number of digits in a measurement, not including any zeros at the beginning.

For example, the number of significant figures in 0.0682 is three.

- The number of significant figures in a value indicates how precisely you know the number. For example, a measurement given as 4.32 m has three significant figures. This means the measurement is known to the nearest 0.01 m (1 cm).

Determining a correct number of significant figures

- When reading a number from left to right, the first significant figure is the first digit other than zero.

For example, the first significant figure in 0.0690 is 6.

The first significant figure in 700184 is 7.

Counting significant figures in numbers less than 1

- To find the total number of significant figures, count the digits from left to right, starting from the first significant figure.

0.07613
↑↑↑↑

Therefore, this number is given to 4 significant figures (4 s.f.)

The number of significant figures given for calculated quantities should be the same as the least number of significant figures in the raw data used in that specific question.

- Presentation of data, page 51-

To abide by this rule of presentation of data, the student must know how to count significant figures in the raw data given in the question.

Counting significant figures in large numbers

- The zeros are written to give place value but are ignored when counting significant figures, unless they come between two other non-zero digits. The counting is again from left to right.

80045000
↑↑↑↑

Therefore, this number has five significant figures (5 s.f.)

Changing to a specified number of significant figures

- Changing a number to a specified number of significant figures involves rounding.

For example, 535520 written to two significant figures is 540 000

- To decide the value of the final significant figure, you either round the next digit up or down.

