# Unit 6: Introduction to Vectors

## Chapter 1: An Introduction to Vectors

Studying Tips: Vectors is a completely different type of math in comparison to calculus; in simple words, vectors are a type of algebra that involves lots of straight-line functions. If you have taken the grade 12 physics course, this unit should be a breeze for you. If not, vectors might seem a little abstract when it’s explained from purely a math perspective. Chapter 1 questions do not frequently appear on the unit test as they are mostly definition based and only involve simple calculations (1-2 mark questions).

## Chapter 2: Vector Addition

Studying Tips: We recommend you to first review the cosine law. Most of the word problems in this chapter are based on cosine law combined with rules of vector addition/subtraction. We also recommend you to focus on doing the word problems in this chapter as practice. Word problems from this chapter are somewhat frequently tested and may be worth up to 5 marks.

## Chapter 3: Multiplication of a Vector by a Scalar

Studying Tips: make sure that you can differentiate between a vector and a scalar. Don’t treat this as rocket science - the same rules for order of operation applies to vectors. The key to this chapter is not to overthink - although the new vocabulary in this chapter seems daunting, the concepts behind them are rather simple.

## Chapter 4: Properties of Vectors

Studying Tips: this chapter, although not especially difficult, is very important. It outlines how the order of operations works for vectors, the fundamentals for vector operations in the upcoming chapters and units. We recommend you to spend more time on this chapter to ensure that you know how vectors work in all situations. Teachers most likely will not test you on the properties of vectors separately; they will test your knowledge on the properties by giving you a complex word problem that may be worth up to 5 marks.

## Chapter 5: Vectors in and

Studying Tips: this chapter is very important as it explains to you the basics of vectors in R2 and R3; you have to know the terms and what they look like before doing operations for vectors in R2 and R3. Make sure you know exactly how vectors are drawn in R2 and R3, including the axis of the plane and how coordinates work on these planes.

## Chapter 6: Cartesian Operations in 2 Space

Studying Tips: the concept of unit vectors is the key to this chapter. Almost all the operations you do in this chapter and the upcoming chapters will involve unit vectors. Questions from this chapter can be worth 3-5 marks depending on their complexity; some typical questions include 1) finding position vector 2) determine the characteristics of the triangle formed by certain vectors 3) simplifying questions.

## Chapter 7: Cartesian Operations in 3 Space

Studying Tips: Straightforward questions from this chapter may worth up to 4 marks; the slightly challenging questions that involve solving unknown variables may worth up to 5 marks. R3 questions may appear more frequently than R2 questions; this is because teachers can test your knowledge on R2 using R3 questions. During the test, we recommend you to draw a rough sketch to check your work for R3 questions; sometimes, rough sketches will reduce your chance of making small errors while doing vector operations.

## Chapter 8: Linear Combinations and Spanning Set

Studying Tips: this is a minor concept in this unit. Usually, teachers either 1) only put one or two Chapter 8 questions in the long answer or 2) put multiple questions in the MC or fill in the blanks sections. Although these questions are not frequently tested, they may still be worth up to 5 marks

Unit Studying Tips:

* Unit tests are usually out of 40-50 marks.
* Once you are good with the basics, focus on studying the R2 and R3 cartesian operations; these questions are the most frequently asked and worth the most number of marks.
* Create a list of questions that you are least comfortable with, and study them right before the test.
* Teachers likely will ask the same types of questions they teach you without making too many modifications - this unit is challenging in the sense that it's new for many students.
* Try our practice test without looking at the answers; if you can score 80% and above, you most likely will do well on your real test.

During the Test:

* Read all questions carefully; in this unit, make sure to draw some rough sketches when solving R3 questions; this will prevent you from getting lost in the coordinates.
* If you catch an error in the last minute of the class, don’t erase your entire solution; you always get part marks for those long answers.
* Check over your work as many times as possible - there is no rush to hand in your work early.