

Aims and Objectives for Relativity I and Vectors PHY1105 Session 1

POSITION, VELOCITY and ACCELERATION

Aims (What I intend to do)

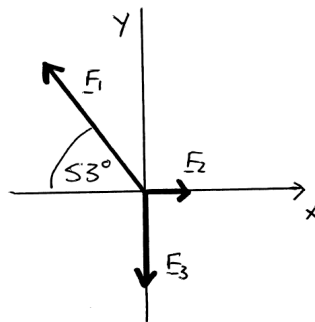
- 1) To look at motion as a sequence of events.
- 2) To see the power of space-time diagrams in describing motion.
- 3) To review the concept of force.

Objectives (What you should be able to do after completing the lecture and worksheet)

- 1) To be able to identify and use the mathematical relationships between position, velocity and acceleration.
- 2) To be able to describe the motion expected from any given space-time diagram.
- 3) To recognise the vector nature of forces, and to be able to describe some of the basic forces in Nature.

Relativity 1 and Vectors PHY1105 Worksheet 1

- Task 1.** Check that you already know and understand the material in Ch2 of Young and Freedman (motion along a straight line). If not then work on those sections you need.
- Task 2.** Go over your lecture notes and re-read sections 4.1 of Young and Freedman (superposition of forces).
- Task 3.** Three forces act at a point as illustrated, they are all in the same plane. The magnitudes of the three forces are $F_1 = 250$ N, $F_2 = 50$ N and $F_3 = 120$ N. Find the x- and y-components of the net force, and find the magnitude and direction of the net force.



- Task 4.** Two forces have the same magnitude F . What is the angle between the vectors if their sum has a magnitude of (a) $2F$? (b) $\sqrt{2}F$? (c) zero? Sketch the two vectors in each case.
- Task 5.** *Preparation for lecture 3:* Read Young and Freedman sections 37.3 and 37.4 (time and length in special relativity).