Trial test, Physics 1, UNSW

for introductory level subjects. Not for physics majors or higher physics

This test is a self-administered, self-marked trial.

Reading time:	5 minutes
Allowed time:	30 minues
Allowed material:	pen, paper,
	calculator without alphanumeric keys, eg standard UNSW model.
	No books or written material.
Data supplied:	$g = 9.8\ ms^{-2}$.

What is this test for?
The first formal feedback you will receive is from the midsession test, which is based on the first half of the semester. After allowing you time to revise the first seven weeks' work, and us time to mark the test, this feedback therefore comes in the second half of the semester. This test will give you earlier feedback. It will also give you some idea of how tests are marked.

Warning: this test is not based on a typical sample of material.
This test is based on material covered briefly in your first three weeks of lectures. Most of this is revision of high school material, and relatively few new concepts are covered. It may therefore seem easier than one based on material from later sections with which you will be less familiar.

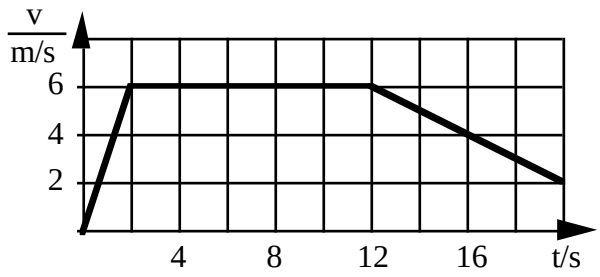
How to mark this test.
Download the answers and marking scheme *after you have completed the test*.

Don't be over-generous in your marking. Near enough is not necessarily good enough. If your answer is a number when you have been asked for a quantity or if the answer is a vector and you have given a scalar, you will in general lose marks. You should also think about the appropriate number of significant figures in the answer, although this will not usually lose marks in tests of this sort.

Explanation is required. In the model answers, the text *is* required (except for the text in small italics, which is there by way of explanation of the answers).

If you get the first part of a question wrong, and if that answer is then used in further parts, you will not lose further marks for the subsequent parts, provided that your argument and working are correct.

Question 1 **[Marks 10]**



(a) A runner runs along a straight line with the velocity-time graph shown in figure. How far does she travel in 20 seconds?

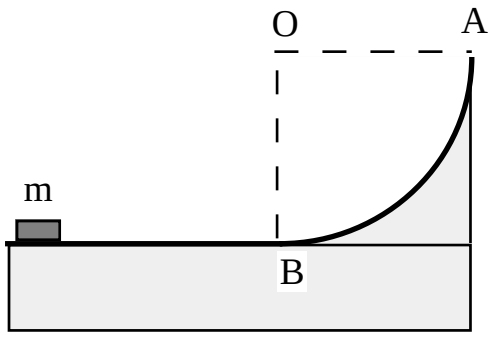
(b) What is the average acceleration of the runner during the first 8.0 seconds?

(c) Displacement of a particle in 3-dimensional space is $\underline{\mathbf{s}}$ = (5.0,2.0,–1.0) where coordinates are given in metres. A constant force $\underline{\mathbf{F}}$ = (2.0,–0.50,8.0) (in newtons) acts on the particle. Find:

(i) the work done by the force

(ii) the angle between $\underline{\mathbf{F}}$ and $\underline{\mathbf{s}}$.

Question 2 **[Marks 10]**



A block of mass m = 1.0 kg is sliding along a horizontal frictionless table with speed v = 3.0 m.s^{-1}. At the point B, the table is connected with a circular track. The radius of curvature of the track is R = 1.0 m. The angle ABO = 90°. The coefficient of kinetic friction between the block and the track is μ = 0.50.

(a) Show all the forces which act on the block immediately after it passes the point B.

(b) Calculate the vertical and horizontal acceleration of the block at this instant.