2 **(a)** A student walks from A to B along the path shown in Fig. 2.1.

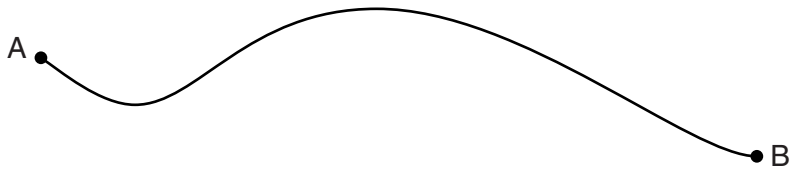

Fig. 2.1

The student takes time *t* to walk from A to B.

(i) State the quantity, apart from *t*, that must be measured in order to determine the average value of

1. speed,

.....

.....[1]

2. velocity.

.....

.....[1]

(ii) Define *acceleration*.

.....[1]

(b) A girl falls vertically onto a trampoline, as shown in Fig. 2.2.

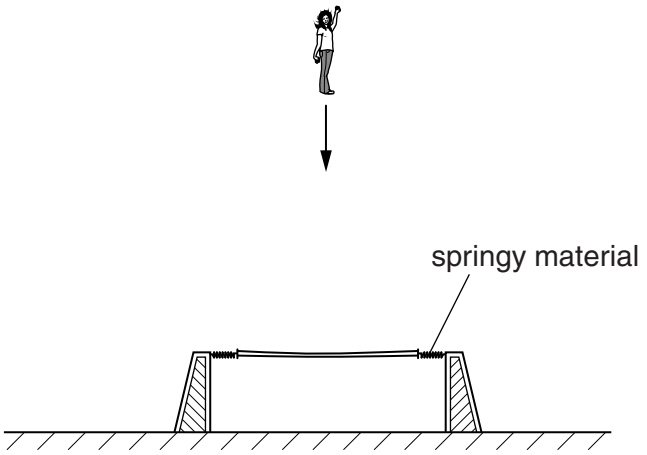

Fig. 2.2

The trampoline consists of a central section supported by springy material. At time $t = 0$ the girl starts to fall. The girl hits the trampoline and rebounds vertically. The variation with time t of velocity v of the girl is illustrated in Fig. 2.3.

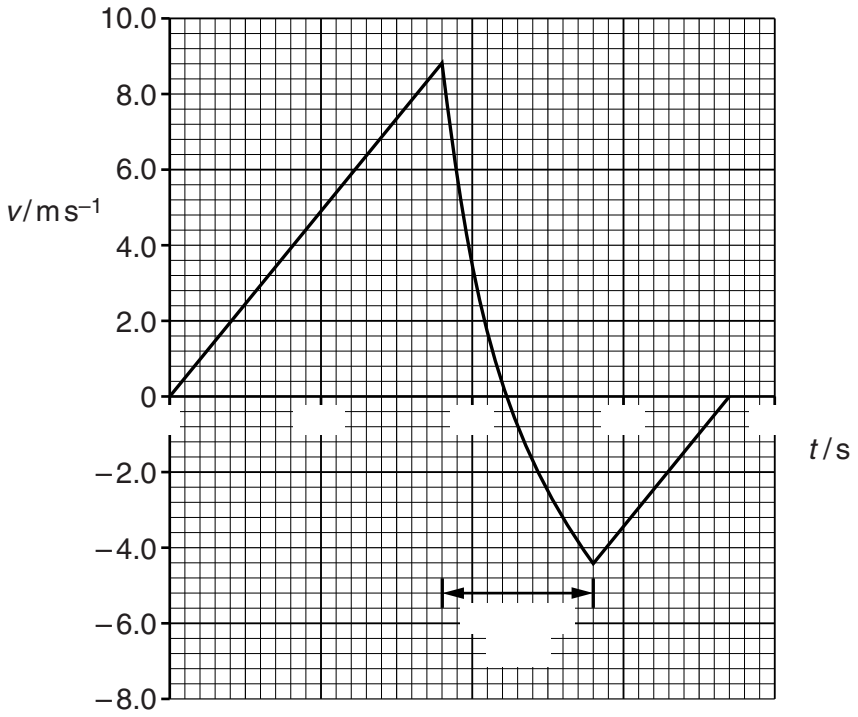

Fig. 2.3

the motion of the girl, calculate

(i) the distance fallen between time $t = 0$ and when she hits the trampoline,

distance = ... m [2]

(ii) the average acceleration during the rebound.

acceleration = ... $m\,s^{-2}$ [2]

(c) (i) Fig. 2.3 to compare, without calculation, the accelerations of the girl before and after the rebound. Explain your answer.

.....

.....

.....[2]

(ii) Fig. 2.3 to compare, without calculation, the potential energy of the girl at $t = 0$ and $t = 1.85\,s$. Explain your answer.

.....

.....

.....[2]