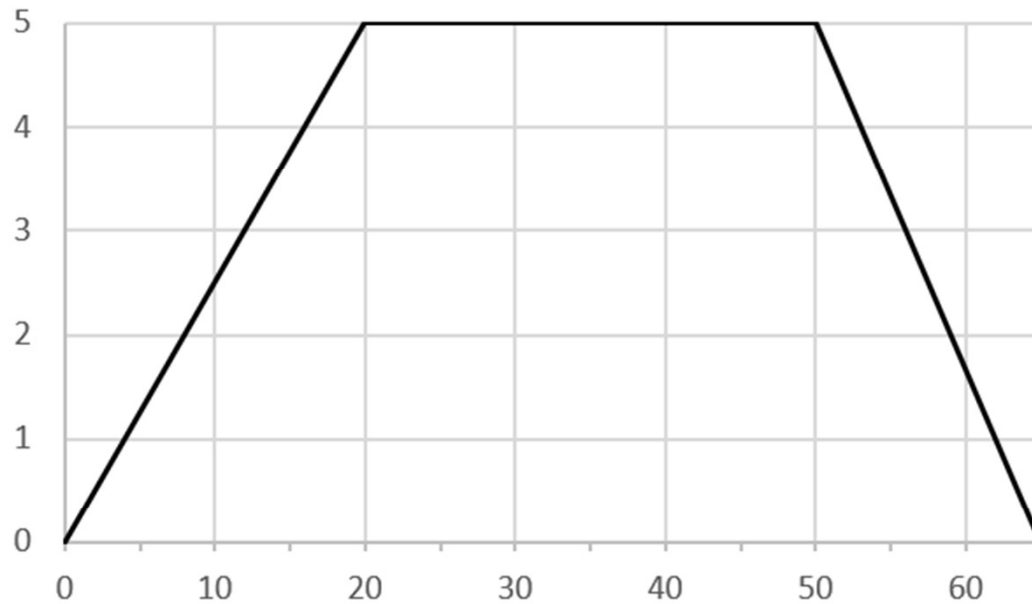


## Unearthing SUVAT equations 1

1. A cyclist rides in a straight line for 20 minutes. She waits for half an hour, then returns in a straight line to her starting point in 15 minutes. Here is a displacement-time graph for her journey:



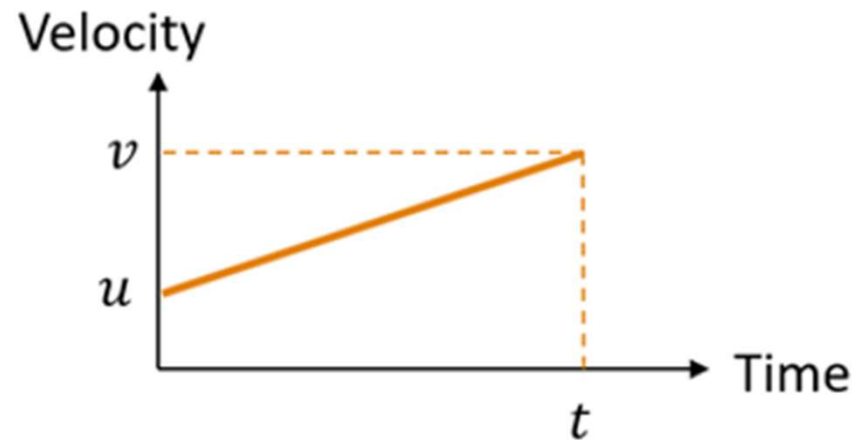
- (a) Work out the average velocity for each stage of the journey in  $\text{km h}^{-1}$ .
- (b) Write down the average velocity for the whole journey.
- (c) Work out average speed for the whole journey.

## Unearthing SUVAT equations 2

2. A particle moves along a straight line. The particle accelerates uniformly from rest to a velocity of  $8 \text{ ms}^{-1}$  in  $T$  seconds. The particle then travels at a constant velocity of  $8 \text{ ms}^{-1}$  for  $5T$  seconds. The particle then decelerates uniformly to rest in a further  $40 \text{ s}$ .
- (a) Sketch a velocity-time graph to illustrate the motion of the particle.
  - (b) Given that the total displacement of the particle is  $600 \text{ m}$ , find the value of  $T$ .

## Unearthing SUVAT equations 3

$s$ : displacement  
 $u$ : initial velocity  
 $v$ : final velocity  
 $a$ : acceleration  
 $t$ : time



Find as many equations as possible that connect some of the variables:  $s$ ,  $u$ ,  $v$ ,  $a$ ,  $t$ .

## Unearthing SUVAT equations 4

1. A cyclist travels along a straight road. She accelerates at a constant rate from a velocity of  $4 \text{ ms}^{-1}$  to a velocity of  $7.5 \text{ ms}^{-1}$  in 40 seconds.
  - (a) Find the distance she travels in these 40 seconds.
  - (b) Find her acceleration in the same time period.
2. A particle is moving in a straight horizontal line with constant deceleration  $4 \text{ ms}^{-2}$ . At time  $t=0$  the particle passes through a point O with speed  $13 \text{ ms}^{-1}$  travelling towards a point A, where  $OA=20 \text{ m}$ . Find:
  - (a) the times when the particle passes through A.
  - (b) the value of  $t$  when the particle returns to O.
3. A cheetah has the ability to accelerate from rest to  $108 \text{ kmh}^{-1}$  in 25 metres. Find the acceleration. What assumption have you made?
4. The Highway Code states that a car travelling at  $20 \text{ ms}^{-1}$  requires a minimum braking distance of 30 m. What deceleration is this and how long will it take for the car to come to rest?