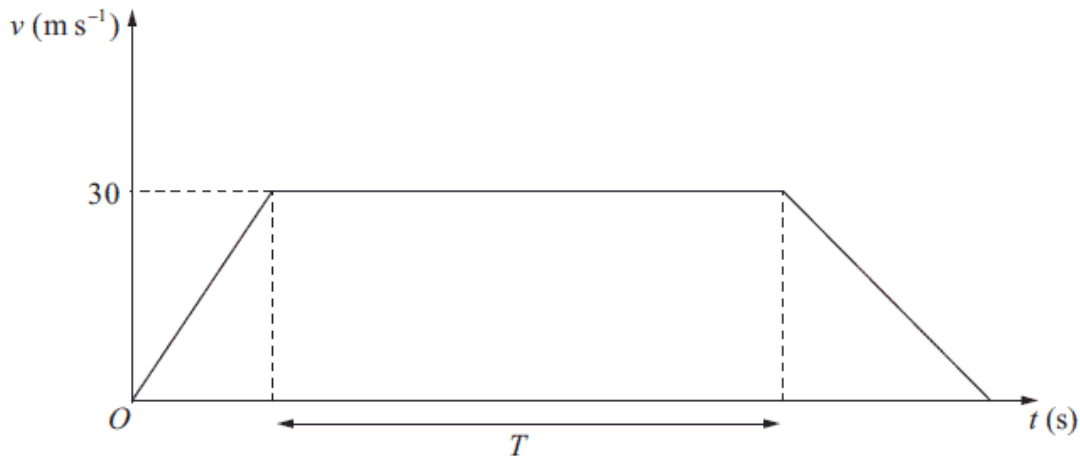


## Year 1 – Week 10 Exam Questions

Question	1	2	3	4	5	6	Total
Marks							
Max Marks	7	8	9	7	7	6	44

### Question 1

Edexcel Jan 2013 Qu 5(a)(b)



**Figure 4**

The velocity-time graph in Figure 4 represents the journey of a train  $P$  travelling along a straight horizontal track between two stations which are 1.5 km apart. The train  $P$  leaves the first station, accelerating uniformly from rest for 300 m until it reaches a speed of  $30 \text{ m s}^{-1}$ . The train then maintains this speed for  $T$  seconds before decelerating uniformly at  $1.25 \text{ m s}^{-2}$ , coming to rest at the next station.

- (a) Find the acceleration of  $P$  during the first 300 m of its journey. (2)
- (b) Find the value of  $T$ . (5)

### Question 2

Edexcel June 2012 Qu 5

A particle  $P$  is projected vertically upwards from a point  $A$  with speed  $u \text{ m s}^{-1}$ . The point  $A$  is 17.5 m above horizontal ground. The particle  $P$  moves freely under gravity until it reaches the ground with speed  $28 \text{ m s}^{-1}$ .

- (a) Show that  $u = 21$  (3)

At time  $t$  seconds after projection,  $P$  is 19 m above  $A$ .

- (b) Find the possible values of  $t$ . (5)

### Question 3

Edexcel June 2013 Qu 4

A lorry is moving along a straight horizontal road with constant acceleration. The lorry passes a point  $A$  with speed  $u \text{ m s}^{-1}$ , ( $u < 34$ ), and 10 seconds later passes a point  $B$  with speed  $34 \text{ m s}^{-1}$ . Given that  $AB = 240 \text{ m}$ , find

- (a) the value of  $u$ , (3)
- (b) the time taken for the lorry to move from  $A$  to the mid-point of  $AB$ . (6)

### Question 4

A car is moving along a straight horizontal road with constant acceleration. There are three points  $A$ ,  $B$  and  $C$ , in that order, on the road, where  $AB = 22 \text{ m}$  and  $BC = 104 \text{ m}$ .

The car takes  $2 \text{ s}$  to travel from  $A$  to  $B$  and  $4 \text{ s}$  to travel from  $B$  to  $C$ .

Find

- (a) the acceleration of the car,
- (b) the speed of the car at the instant it passes  $A$ .

[7 marks]

### PURE MATHS

#### Question 5

The points  $A$  and  $B$  have coordinates  $(6, 1)$  and  $(-2, 7)$  respectively.

- (a) Find the length of  $AB$ . [2 marks]
- (b) Find the gradient of the line  $AB$ . [2 marks]
- (c) Determine whether the line  $4x - 3y - 10 = 0$  is perpendicular to  $AB$ .  
Fully justify your answer. [3 marks]

#### Question 6

In this question you must show detailed reasoning.

Determine for what values of  $k$  the graphs  $y = 2x^2 - kx$  and  $y = x^2 - k$  intersect.

[6 marks]