

New
Specification



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2019

Centre Number

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Candidate Number

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Mathematics

Assessment Unit AS 2

assessing

Applied Mathematics

MV18

[SMT21]

WEDNESDAY 22 MAY, MORNING

Time

1 hour 15 minutes, plus your additional time allowance.

Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write on blank pages or tracing paper.

Complete in black ink only. Questions which require drawing or sketching should be completed using an HB pencil.

Candidates must answer **all** questions from sections A and B. Equal time should be spent on each section. Show clearly the full development of your answers.

Answers without working may not gain full credit.

Answers should be given to three significant figures unless otherwise stated.

You are permitted to use a graphic or scientific calculator in this paper.

Information for Candidates

The total mark for this paper is 70. The total available mark for each section of this paper is 35.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Answers should include diagrams where appropriate and marks may be awarded for them.

Take $g = 9.8 \text{ m s}^{-2}$, unless specified otherwise.

A copy of the **Mathematical Formulae and Tables booklet** is provided.

Throughout the paper the logarithmic notation used is $\ln z$ where it is noted that $\ln z \equiv \log_e z$

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(Questions start overleaf)

- 3 **Fig. 2** below shows the velocity–time graph for an athlete running a 100 m race in 11.8 seconds.

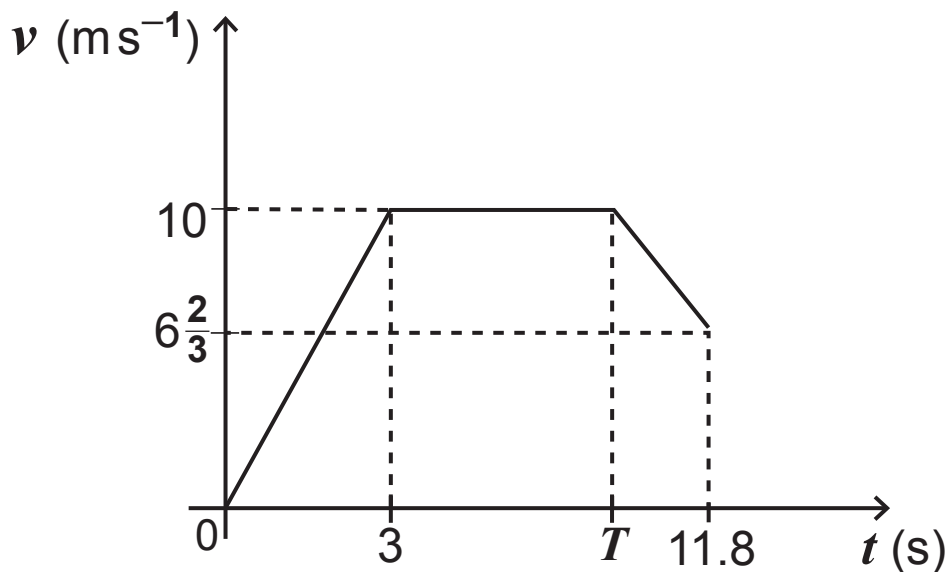


Fig. 2

- (i) Describe the motion of the athlete between $t = 0$ and $t = 3$ [1 mark]

The athlete starts to decelerate at time T .

- (ii) Find the value of T . [5 marks]

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(Questions continue overleaf)

- 4 **Fig. 3** below shows two boxes, A and B, connected by a rope passing over a smooth, light, fixed pulley.

Box A is held at rest on a rough horizontal table 5 m from the pulley.

Box B hangs 2.5 m vertically above the floor.

A and B have masses 8 kg and 6 kg respectively.

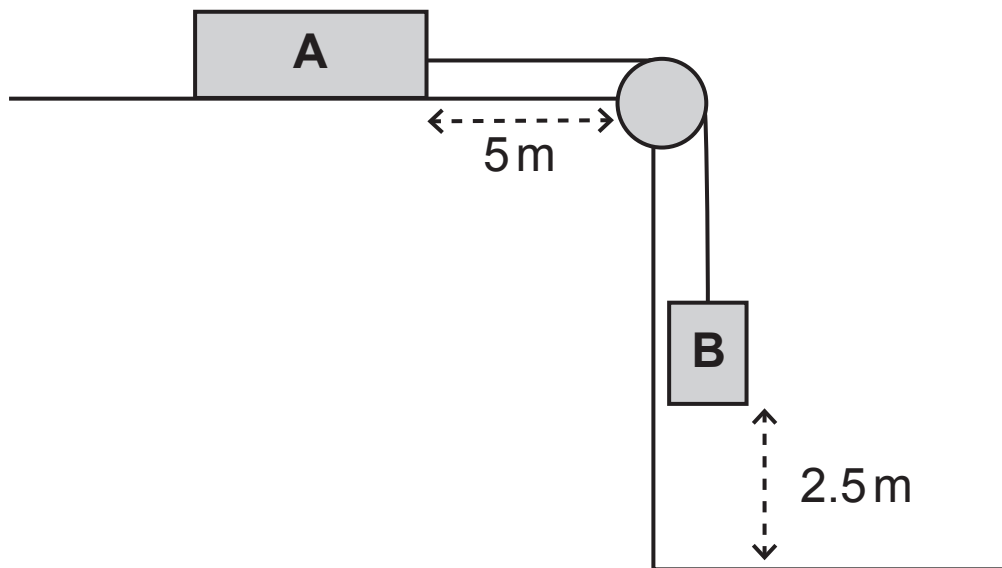
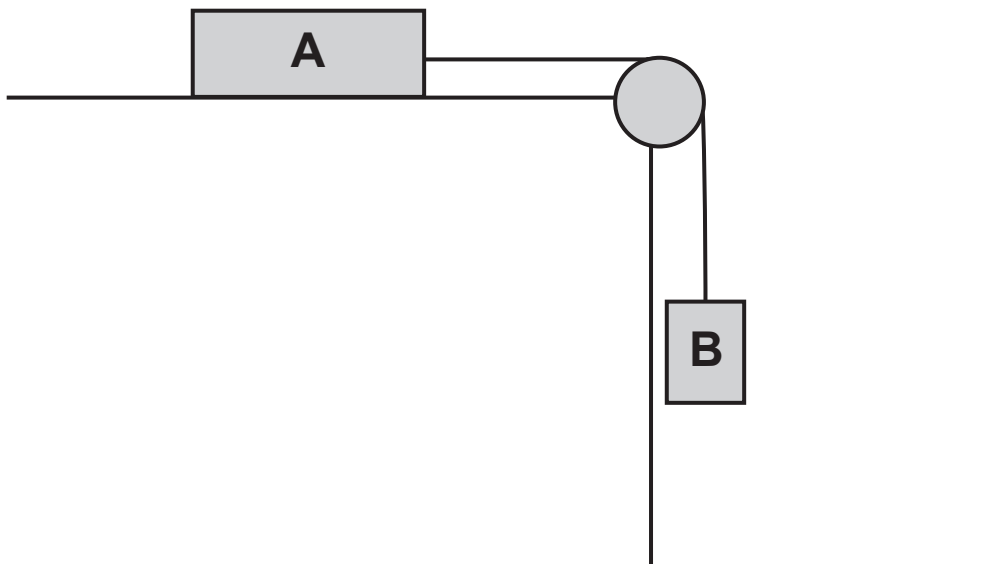


Fig. 3

Box A is released from rest.

- (i) Complete the diagram below showing all the external forces acting on A and B. [2 marks]



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Further investigations suggested that the weekly income of £374 was recorded incorrectly and should in fact have been £347

Without carrying out any further investigation, state what effect, if any, this change would have on:

(iii) the standard deviation, [1 mark]

(iv) the interquartile range. [1 mark]

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(b) The histogram in **Fig. 4** below shows the weekly incomes, in £, of a random sample of households in a neighbourhood.

Histogram showing weekly incomes

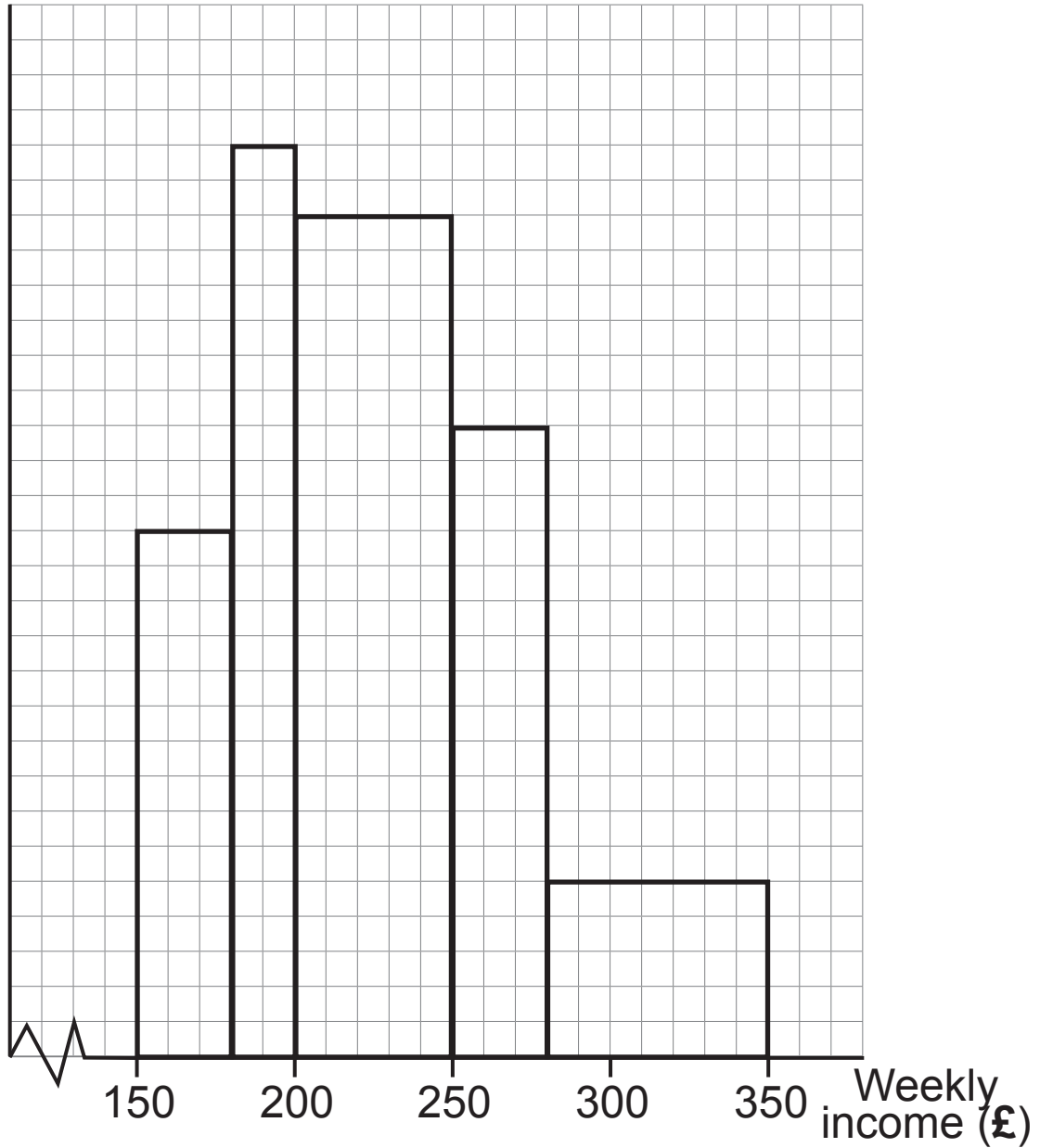


Fig. 4

(ii) Comment on the value obtained in part **(i)**. [1 mark]

- 8 A school sports club has 15 members. The probability of any member, chosen at random, being injured throughout the school year is p .

Let X be the random variable “the number of members injured throughout the school year”.

- (i) Find an expression, in terms of p , for $P(X = 1)$
[3 marks]

This is the end of the question paper

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	

Total Marks	
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Examiner Number

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