

MU123

TMA 01

2021B

Covers Units 1 and 2

Cut-off date 9 March 2021

Submission instructions

You will find instructions for completing TMAs in the ‘Assessment’ area of the MU123 website. Please read these instructions before beginning work on this TMA.

Special instructions

Question 5 asks you to think about the communication of your mathematics throughout this TMA. You might find it helpful to read this question first so that you can bear it in mind as you work through the other questions.

Question 1 – 10 marks

This question is based on your work on MU123 up to and including Unit 1, concentrating on good mathematical communication (GMC).

Consider the following TMA question:

A shelf in a bookshop is 87 cm long and holds exactly 32 books, all the same width. Find the width of one book, in cm, giving your answer correct to one decimal place.

Here is a student's attempt at a solution, with the correct numerical result:

$$87 = 87/32 = 2.7 = \text{width}$$

- (a) With reference to good mathematical communication (GMC), describe three aspects of the student's solution that could be improved. [6]
- (b) Write out your own solution to this question. [4]

You will find pages 54–8 of Book A useful.

Question 2 – 30 marks

This question is based on your work on MU123 up to and including Unit 1.

- (a) A craftworker needs exactly 4 m of material to make 15 soft toys. Calculate the length of material needed to make 18 soft toys. [5]
- (b) A tutor has 19 MU123 students in their tutor group. Within this group 5 students are registered for a Mathematics qualification. Calculate the percentage of students in this tutor group who are registered for a Mathematics qualification. Give your answer correct to the nearest whole number. [5]
- (c) There are 360 children in a school. Of these children, 85% stay for school lunches.
- (i) Calculate the number of children who stay for school lunches. [3]
- (ii) Write the number of children who stay for school lunches as a fraction of the total number of children in the school. Give your answer in its simplest form. [2]
- (d) (i) Rahim, Jack and Sophie are growing marrows for the local horticultural show. Rahim's marrow weighs 2.41 kg. Jack's marrow is 13% heavier than Rahim's. Calculate the weight of Jack's marrow. Give your answer correct to three significant figures. [5]
- (ii) Sophie's marrow is $\frac{5}{7}$ of the weight of Jack's marrow. Calculate the weight of Sophie's marrow. Give your answer correct to three significant figures. [5]
- (e) Charlotte's mobile phone alerts her to the amount of screen time she has had in the previous week. On one week her screen time falls from an average of 54 minutes a day to an average of 46 minutes a day. Calculate the percentage decrease in Charlotte's screen time, giving your answer correct to one decimal place. [5]

Question 3 – 20 marks

This question is based on your work on MU123 up to and including Unit 2.

- (a) Iwan is training to take part in one of the cycle races in the Cambrian Coast Sportive. The route is 165 km and Iwan hopes to complete it in 7 hours 30 minutes. Find his average speed in km per hour if he completes the route in this time. [4]
- (b) On the day of the race, Iwan cycles at an average speed of 21.6 km per hour. Find the time taken by Iwan to complete the 165 km route. Give your answer in hours and minutes, correct to the nearest minute. [6]
- (c) Iwan studies the route of the race on a map with a scale of 1 : 250 000. He can see that the first section of the route follows the coast. If this section measures 10.7 cm on the map, find the corresponding distance on the ground. Give your answer in km correct to three significant figures. [5]
- (d) There is a very steep uphill section of the route near the halfway point. It starts at 185 m above sea level and finishes at 554 m above sea level. Let h represent the height in m above sea level.
- (i) Explain what the inequality $h \geq 185$ means in this practical context. [1]
- (ii) Draw a number line to illustrate the range of heights above sea level encountered on this uphill section. [1]
- (iii) Give a double inequality, using h , to describe the range of heights above sea level encountered on this uphill section. [3]

Question 4 – 20 marks

This question is based on your work on MU123 up to and including Unit 2.

- (a) A hot air balloon takes off from the ground and begins to ascend. Its height increases steadily, at a rate of 2.2 m per second.

- (i) Using this information, complete a copy of the table below.

Time, T , in seconds	0	5	10	20	25	35	50
Height of balloon, H , in metres	0	11	22				

[2]

- (ii) Mark the points from part (i) on a graph, with the vertical axis showing H , the height of the balloon in metres, and the horizontal axis showing T , the time in seconds. Draw a line through these points. You will find the tips for drawing graphs on page 84 of Unit 2 useful.

You can draw your graph either by hand (using graph paper) or using a computer.

[6]

- (iii) Explain how you could *use your graph* to find the time when the balloon's height is 70 m. How long (to the nearest second) does the balloon take to reach this height?

[3]

- (b) Entry tickets for a wildlife park cost £15.95 per adult and £8.50 per child.

- (i) Calculate the total cost of admission for three adults and two children.

[1]

- (ii) Write down a formula for the total cost T , in £, if a is the number of adults and c is the number of children. Explain your reasoning.

[3]

- (c) Given that

$$k = \frac{a - c^2}{2b},$$

find the value of k when $a = 1.8$, $b = -0.35$ and $c = -1.3$.

Give your answer correct to two significant figures.

[5]

Question 5 – 10 marks

*This question concerns the important theme of **good mathematical communication (GMC)**.*

Copy *both* sections of the form below, and complete Section (a). Your tutor will complete Section (b).

(a) (i)	Read over Subsection 5.3 of Unit 1. Write down two points about good mathematical communication that you have tried to put into practice in writing your answers in this TMA. [1]
(ii)	For each point that you mentioned in part (a)(i), give a specific example (e.g. Question 3(b)) from this TMA where you have put the point into practice. [1]
(b)	Your tutor will award up to eight marks for good mathematical communication in Questions 2, 3 and 4 of this TMA, and will comment on your mathematical communication below. <i>Please leave at least half a page blank here for your tutor's comments.</i> [8]

Question 6 – 10 marks

This question is about planning and completing your work for the next assignment. Part (e) asks you to tell us your reason for studying MU123 so that your tutor can better support you.

You are encouraged to use the form on the next page for your answers to this question.

(a) Write down the cut-off date for MU123 TMA 02. [1]

(b) Describe one factor that will affect how you plan your work on MU123 between now and the cut-off date for TMA 02. How do you intend to take this factor into account?

For example, this could include other commitments, such as family or work, or factors resulting from your work on TMA 01 or iCMA 41. [3]

(c) TMA 02 covers work from Unit 3, Numbers, Unit 4, Statistical summaries, and Unit 5, Algebra. Look quickly through these units so that you get an idea of what to expect.

Which of the following statements apply to you? You can choose one or more.

A: I am fairly confident that I can complete the TMA on time.

B: I am concerned that I may not have enough time to complete the TMA on time.

C: I am concerned that I may not be able to cope with some of the maths in Units 3, 4 and 5.

D: None of the three statements A, B and C applies to me. [1]

(d) Write a brief explanation of your choice of options in part (c). [2]

(e) Briefly describe your reasons for studying MU123. If you are studying for an award such as a certificate, diploma or degree then include the name of the award in your answer. [3]

TMA 01 Question 6

(a)	The cut-off date for TMA 02 is:
(b)	One factor that will affect how I plan my work on MU123 between now and the cut-off date for TMA 02. How I intend to take this factor into account.
(c)	My choice of option is: A ☐ B ☐ C ☐ D ☐
(d)	My reasons for choosing the option(s) in part (c).
(e)	My reasons for studying MU123.