Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel
Level 3 Certificate

Centre Number | | | | | |

Candidate Number | | | | |

Wednesday 15 May 2019

Morning (Time: 1 hour 40 minutes) | Paper Reference **7MC0/01**

Mathematics in Context

Paper 1: Comprehension

You must have: Ruler graduated in centimetres and millimetres, pen, HB pencil, eraser, calculator.
Source booklet.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The total mark for this paper is 60
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P60689A

1/2/1/1/1/1/

P 6 0 6 8 9 A 0 1 1 2

Pearson

SECTION A

Answer ALL questions. Write your answers in the spaces provided.

AIR TRAVEL

Refer to **data source A** in the source booklet for questions 1 and 2.

1 (a) Calculate the number of passengers handled per aircraft movement in 2006

(3)

(b) Hence calculate the increase in the number of passengers handled per aircraft movement between 2006 and 2016

(3)

(Total for Question 1 is 6 marks)

2 It is predicted that the number of aircraft movements per year for Heathrow will increase by 0.21% each year after 2016

Natalie says,

"Using this prediction, the number of aircraft movements per year for Heathrow will be greater than 480 000 by the end of 2021"

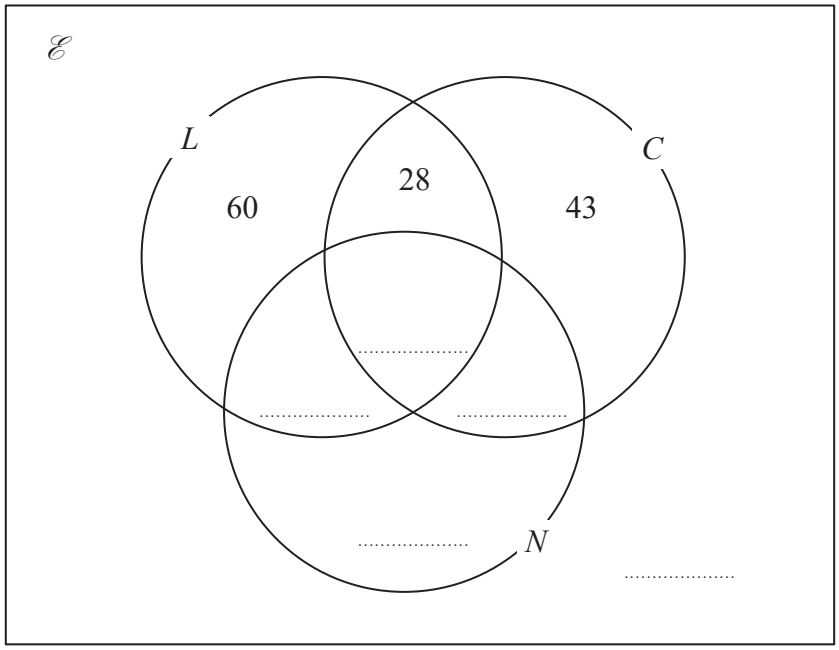
Is Natalie correct?
Justify your answer.

(Total for Question 2 is 4 marks)

Refer to **data source B** in the source booklet for questions 3 and 4.

3 Madeline took a sample of 200 flights delayed in 2014
Some of the flights were delayed for more than one reason.
Madeline recorded all the reasons for each delay.

The Venn diagram shows some information about the delays.



$\mathscr{E}$ = {all flights in Madeline's sample}

L = {flights delayed due to aircraft arriving late}

C = {flights delayed due to air carrier delay}

N = {flights delayed due to NAS delay}

Madeline also has this information for the 200 flights.

110 flights were delayed due to aircraft arriving late

79 flights were delayed due to air carrier delay

62 flights were delayed due to NAS delay

29 flights were delayed due to aircraft arriving late **and** air carrier delay

(a) (i) Use this information to complete the Venn diagram.

(3)

(ii) Write down the number of flights that were delayed due to security or extreme weather or both.

(1)

.....

Write in set notation the events such that the cause of delay was

(b) (i) **not** due to air carrier delay,

(1)

(ii) due to air carrier delay or NAS delay or both,

(1)

(iii) due to security or extreme weather or both.

(1)

Find the following probabilities.

(c) (i) P(N')

(2)

(ii) P($L \mid N$)

(2)

Madeline claims there is a link between a flight being delayed due to aircraft arriving late (L) and air carrier delay (C).

(d) (i) Determine whether or not L and C are independent.

(3)

(ii) Is Madeline's claim correct? Give a reason for your answer.

(1)

(Total for Question 3 is 15 marks)

4 $\mathscr{E}$ = {all flights in Madeline's sample}

L = {flights delayed due to aircraft arriving late}

C = {flights delayed due to air carrier delay}

N = {flights delayed due to NAS delay}

(i) Express the ratio n(L) : n(C) : n(N) in the form 1 : a : b, where a and b are numbers to be given correct to 2 decimal places.

(2)

(ii) By considering the information in Table 2, determine whether the sample of 200 flights Madeline took in question 3 is representative of the reasons for the delays in 2014. Give a reason for your answer.

(3)

(Total for Question 4 is 5 marks)
(Total for AIR TRAVEL is 30 marks)

TOTAL FOR SECTION A IS 30 MARKS

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

SECTION B

Answer ALL questions. Write your answers in the spaces provided.

MUSIC

Refer to **data source C** in the source booklet.

5 (a) (i) Show that the average price of an LP in 2015 was £20

(1)

(ii) Calculate the percentage increase in the number of LPs sold between 2007 and 2015

(3)

Refer to **data source D** in the source booklet.

The table shows some information about prices in 1992 and 2015

	1992 actual price (£)	2015 actual price (£)	2015 inflation adjusted price (£)
LP (Typical)	5.99	20	.....
CD (Typical)	.....	8.73	22.38

(b) (i) Complete the table.

(5)

A recent report claims,

"The cost of listening to music has fallen in real terms between 1992 and 2015"

(ii) Use the information from the completed table in (b)(i) to evaluate this claim.

(2)

(c) (i) Show that the price of the representative sample of retail goods and services used to generate the RPI more than doubled from 1990 to 2015

(2)

(ii) Calculate the percentage increase in the price of the representative sample of retail goods and services used to generate the RPI from 2005 to 2015

(2)

(Total for Question 5 is 15 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

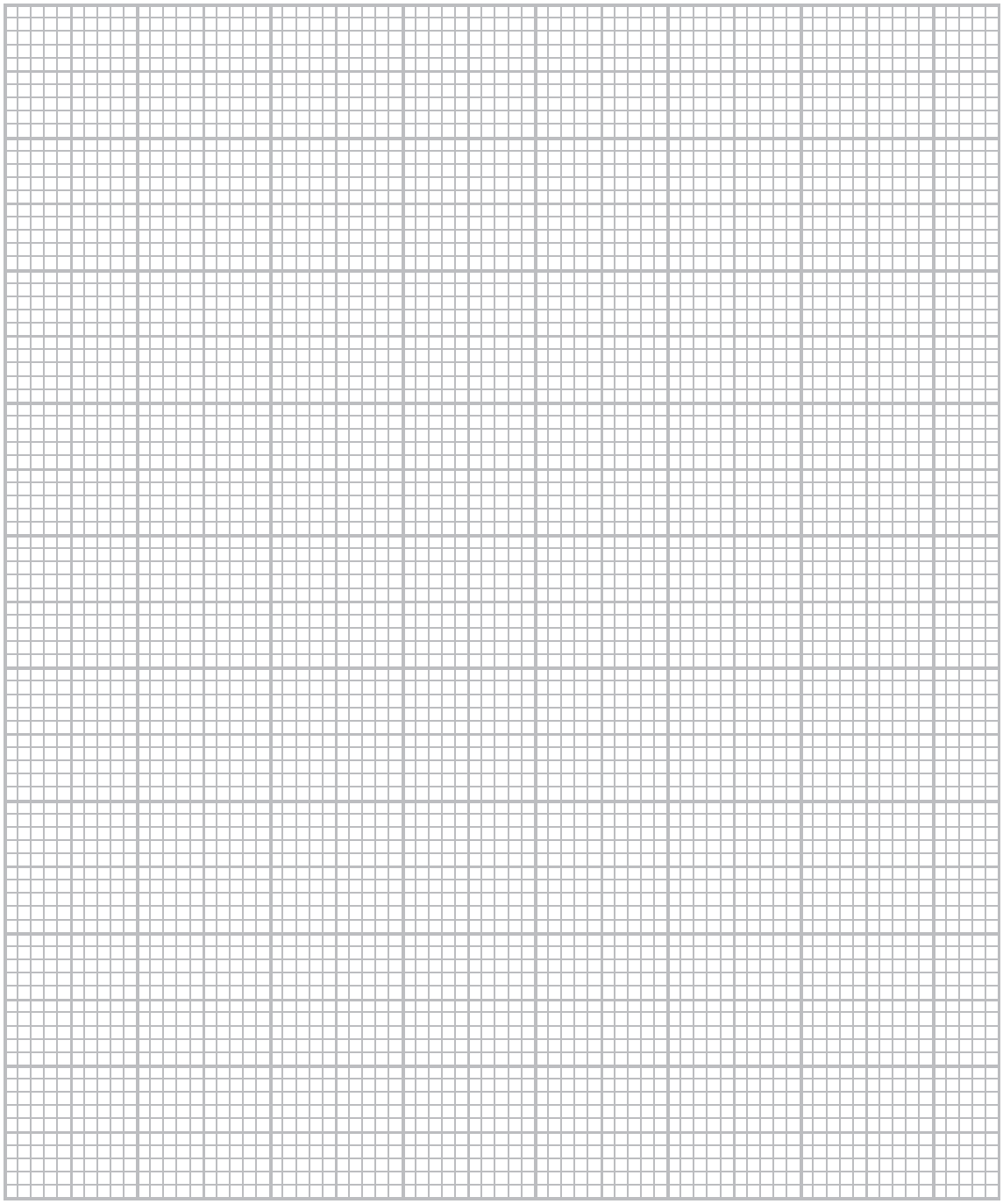
Refer to **data source E** for questions 6 and 7.

6 The table below shows some of the data from Table 4.

Year (x)	2000	2002	2004	2006	2008	2010	2011	2012	2013	2014
Number of LPs sold (thousands) (y)	752	657	453	251	209	234	337	389	781	1200

(i) On the graph paper, draw a diagram that could be used to determine the nature of the relationship between year (x) and number of LPs sold (y).

(4)



Given that

$$\sum x = 20\,080 \quad \sum y = 5263 \quad \sum xy = 10\,569\,972 \quad S_{xx} = 210 \quad S_{yy} = 908\,734$$

(ii) Show that the product moment correlation coefficient lies between 0 and 0.2

(4)

Conor says,

"There is no relationship between years and the number of LPs sold as the product moment correlation coefficient is so low."

(iii) Is Conor correct? Give a reason for your answer.

(2)

(Total for Question 6 is 10 marks)

7 The following model is proposed to predict the number of LPs that will be sold in future years.

$$s = 1.88t^3 - 24t^2 - 0.37t + c$$

where s = number of LPs sold (thousands), t = year − 2000 and c is a constant.

(i) Use the number of LPs sold in the year 2000 to write down a value for c.

(1)

.....

(ii) Use this model to estimate the number of LPs that were sold in the year 2007

(3)

.....

.....

.....

.....

.....

.....

.....

.....

.....

(iii) Assess the reliability of this estimation.
Give a reason for your answer.

(1)

.....

.....

.....

.....

(Total for Question 7 is 5 marks)

(Total for MUSIC is 30 marks)

TOTAL FOR SECTION B IS 30 MARKS
TOTAL FOR PAPER IS 60 MARKS