Additional Assessment Materials
Summer 2021

Pearson Edexcel

GCSE (9-1) in Mathematics 1MA1
Higher (Calculator)

Topic 1: Number and Ratio (Test 3)

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Additional Assessment Materials, Summer 2021

General guidance to Additional Assessment Materials for use in 2021

Context

- Additional Assessment Materials are being produced for GCSE, AS and A levels (with the exception of Art and Design).
- The Additional Assessment Materials presented in this booklet are an optional part of the range of evidence teachers may use when deciding on a candidate's grade.
- 2021 Additional Assessment Materials have been drawn from previous examination materials, namely past papers.
- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.

Purpose

- The purpose of this resource to provide qualification-specific sets/groups of questions covering the knowledge, skills and understanding relevant to this Pearson qualification.
- This document should be used in conjunction with the mapping guidance which will map content and/or skills covered within each set of questions.
- These materials are only intended to support the summer 2021 series.

1 (*a*) Use your calculator to work out $\dfrac{29^2 - 4.6}{\sqrt{35 - 1.9^3}}$

Write down all the figures on your calculator display.

157.668255

.....

(2)

(*b*) Write your answer to part (*a*) correct to 4 significant figures.

157.7

.....

(1)

(Total for Question 1 is 3 marks)

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2 Write 37 cm^3 in mm^3

$\times 10$

cm → mm

$(10)^3 = 1000$

$\times 1000$

$50\ cm^3 \rightarrow mm^3$

$37 \times 1000 = 37000$

37000 ..... mm^3

(Total for Question 2 is 1 mark)

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3 Carlo puts tins into small boxes and into large boxes.

He puts 6 tins into each small box.
He puts 20 tins into each large box.

Carlo puts a total of 3000 tins into the boxes so that

number of tins in small boxes : number of tins in large boxes = 2 : 3

Carlo says that less than 30% of the boxes filled with tins are large boxes.

Is Carlo correct?
You must show all your working.

$\frac{3000}{5} = 600 \rightarrow 1 \text{ part} = 600$

$\times 600$ 2 : 3 $\times 600$

1200 : 1800

small big

$\frac{1200}{6} = 200$ small boxes

$\frac{1800}{20} = 90$ big boxes

$90 + 200 = 290$ total boxes

$\frac{90}{290} \times 100 = 31.034482761\%$ big boxes $\rightarrow$ callu is wrong

(Total for Question 3 is 5 marks)

4 Raya buys a van for £8500 plus VAT at 20%

Raya pays a deposit for the van.
She then pays the rest of the cost in 12 equal payments of £531.25 each month.

Find the ratio of the deposit Raya pays to the total of the 12 equal payments.
Give your answer in its simplest form.

$12 \times 531.25 = 6375$ total payments

$8500 - 6375 = 2125$ deposit

2125 : 6375
D TP

$\frac{6375}{2125} = 3$

1 : 3

.....1 : 3.....

(Total for Question 4 is 5 marks)

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5 The density of ethanol is 1.09 g/cm^3

The density of propylene is 0.97 g/cm^3

60 litres of ethanol are mixed with 128 litres of propylene to make 188 litres of antifreeze.

Work out the density of the antifreeze.
Give your answer correct to 2 decimal places.

Density = mass / volume

1 litre = 1 dm^3 = 100 cm^3

60 litres ethanol = 60,000 cm^3

60000 × 1.09 = 65400 grams ethanol

128 litres polypropene = 128,000 cm^3

128000 × 0.97 = 124,160 grams polypropene

total mass / total vol = 189,560 / 188,000

= 1.01

.....1.01..... g/cm^3

(Total for Question 5 is 4 marks)

6 Katy invests £200 000 in a savings account for 4 years.
The account pays compound interest at a rate of 1.5 % per annum.

Calculate the total amount of interest Katy will get at the end of 4 years.

$200000 \times (1.015)^4 = 212272.7107$

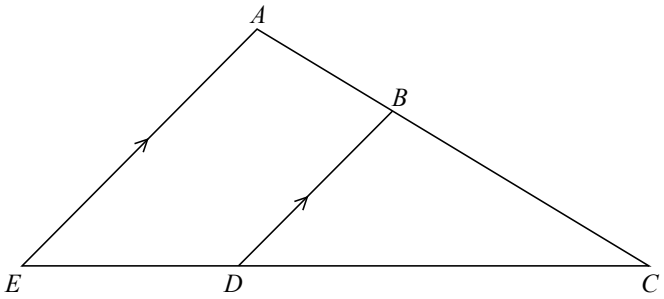
$212272.7107 - 200000 = 12272.71013$

$= £12272.71$

£ 12272.71

(Total for Question 6 is 3 marks)

7



ABC and *EDC* are straight lines.
EA is parallel to *DB*.

EC = 8.1 cm. *DC* = 5.4 cm. *DB* = 2.6 cm.

(*a*) Work out the length of *AE*.

Length scale factor $= \frac{8.1}{5.4} = 1.5$

$2.6 \times 1.5 = 3.9$

3.9 cm

(2)

AC = 6.15 cm.

(*b*) Work out the length of *AB*.

$ED = 1/3$ of EC → so $AB = 1/3$ of AC

$\frac{6.15}{3} = 2.05$

2.05 cm

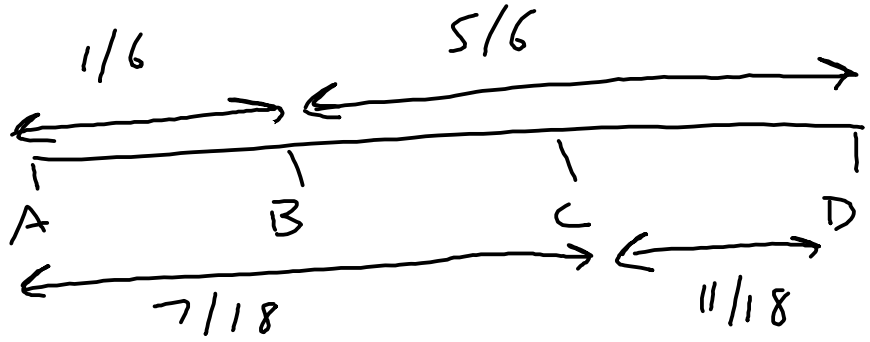
(2)

(Total for Question 7 is 4 marks

8 The points *A, B, C* and *D* lie in order on a straight line.

$AB : BD = 1:5$
$AC : CD = 7:11$

Work out $AB : BC : CD$



$BC = 7/18 - 1/6 = 2/9$

$1/6 : 2/9 : 11/18$
$3/18 : 4/18 : 11/18$

3 : 4 : 11

(Total for Question 8 is 3 marks)

9 There are 16 hockey teams in a league.

Each team played two matches against each of the other teams.

Work out the total number of matches played.

$\frac{30}{2} = 15$ 16 teams $\times 15 = 240$

240

(**Total for Question 9 is 2 marks**)

10 There are some small cubes and some large cubes in a bag.
The cubes are red or the cubes are yellow.

The ratio of the number of small cubes to the number of large cubes is 4 : 7

The ratio of the number of red cubes to the number of yellow cubes is 3 : 5

(*a*) Explain why the least possible number of cubes in the bag is 88

S : L R : Y LCM = 88

4 : 7 = 11 3 : 5 = 8

(1)

All the small cubes are yellow.

(*b*) Work out the least possible number of large yellow cubes in the bag.

S : L × 8 → S : L = 32 : 56

R : Y × 11 → R : Y = 33 : 55

55 = yellow
32 = small

55 − 32 = large and yellow = 23

23

(3)

(Total for Question 10 is 4 marks)

11 Three solid shapes **A**, **B** and **C** are similar.

The surface area of shape **A** is 4 cm^2
The surface area of shape **B** is 25 cm^2

The ratio of the volume of shape **B** to the volume of shape **C** is 27 : 64

Work out the ratio of the height of shape **A** to the height of shape **C**.
Give your answer in its simplest form.

SA
A : B
4 : 25
length ratio
2 : 5

Volume
B : C
27 : 64
length ratio
3 : 4

A : B : C
6 : 15 : 20
length ratios

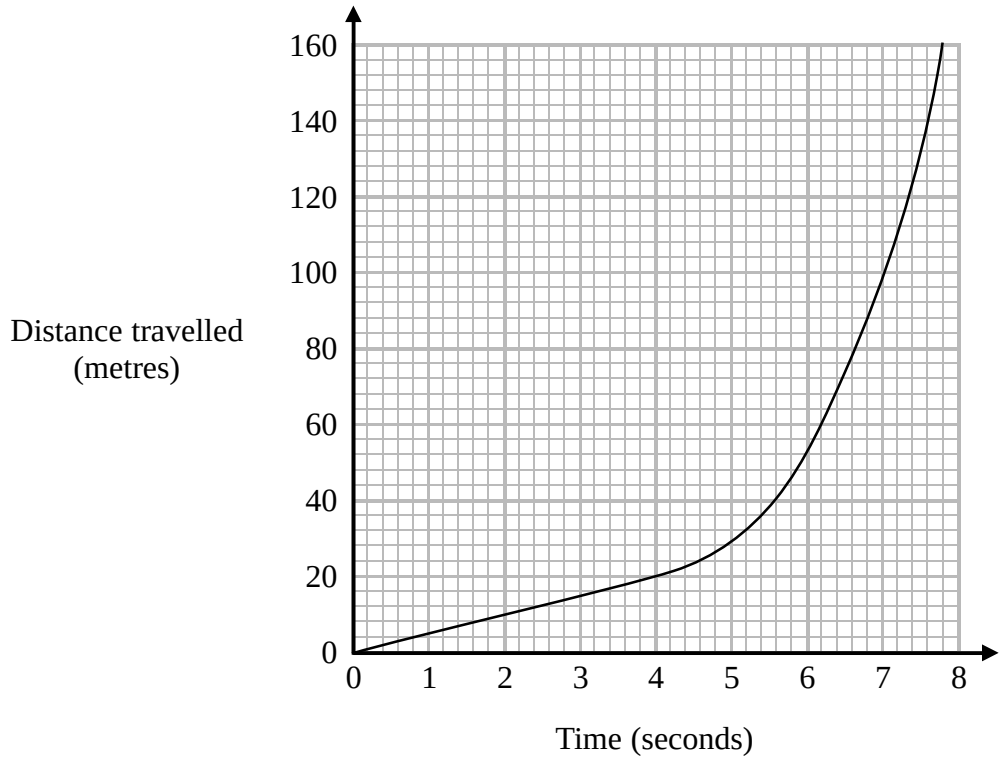
A : C
6 : 20
3 : 10

(length scale factor)^2 = area scale factor
(length scale factor)^3 = Volume scale factor

3 : 10

(Total for Question 11 is 4 marks)

12 The distance-time graph shows information about part of a car journey.



Use the graph to estimate the speed of the car at time 5 seconds.

(3.2, 0) (7, 68) $\frac{68-0}{7-3.2} = \frac{68}{4.2} = 16.2$ m/s

16.2 ..... m/s

(**Total for Question 12 is 3 marks**)

13 The number of rabbits on a farm at the end of month n is P_n
The number of rabbits at the end of the next month is given by $P_{n+1} = 1.2P_n - 50$

At the end of March there are 200 rabbits on the farm.

(*a*) Work out how many rabbits there will be on the farm at the end of June.

March = 200
April = 1.2 (200) − 50 = 190
May = 1.2(190) − 50 = 178
June = 1.2(178) − 50 = 163.6

163

(3)

(*b*) Considering your results in part (*a*), suggest what will happen to the number of rabbits on the farm after a long time.

Rabbits will die out

(1)

(Total for Question 13 is 4 marks)

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14 $d = \frac{1}{8}c^3$

$c = 10.9$ correct to 3 significant figures.

By considering bounds, work out the value of d to a suitable degree of accuracy.
Give a reason for your answer.

upper bound = 10.950
lower bound = 10.850

1/8 (10.950)³ = 164.116 5469
1/8 (10.850)³ = 159.661406

Both rounded to 2 S.f = 160

(Total for Question 14 is 4 marks)

TOTAL FOR PAPER IS 49 MARKS