

MATHEMATICS **B**

Paper 2, 2R

2019 — 2023

Chapter 1	NUMBER	Page 1
Chapter 2	SETS	Page 31
Chapter 3	ALGEBRA	Page 46
Chapter 4	FUNCTIONS & GRAPHS	Page 76
Chapter 5	MATRICES	Page 130
Chapter 6	GEOMETRY	Page 135
Chapter 7	MENSURATION	Page 154
Chapter 8	VECTORS & TRANSFORMATION GEOMETRY	Page 166
Chapter 9	TRIGONOMETRY	Page 215
Chapter 10	STATISTICS & PROBABILITY	Page 229
Chapter 11	DIFFERENTIATION & KINEMATICS	Page 258
	ANSWERS	Page 268

1 - (4MB1/2_Summer_2019_Q2) - Number

In 2017, country A had a population of 2.35×10^7 people.

Of these people, 48% were male.

(a) Calculate the number of males in country A in 2017

(2)

Country A is divided into three regions. These three regions are called East Region, Central Region and West Region.

In 2017, the ratio of the number of males in the East Region to the number of males in the Central Region to the number of males in the West Region was 5 : 3 : 2

(b) Calculate the number of males in the Central Region in 2017

Give your answer in standard form.

(2)

In 2017, the number of females in the Central Region was 12.5% greater than the number of males in the Central Region.

(c) Calculate the number of females in the Central Region in 2017

(2)

In 2010, country B had a population of 2.5×10^7 people.

From 2010 to 2014, the population of country B increased by 2.4%

From 2014 to 2018, the population of country B decreased by 2.4%

(d) Calculate the population of country B in 2018

(2)

2 - (4MB1/2_Winter_2019_Q3) - Number

The original price of each 6-day ski pass is reduced by 15% in a sale.

In the sale the price of each 6-day ski pass is \$272

(a) Calculate the original price of each 6-day ski pass.

(2)

The price of each 3-day ski pass is £110

The exchange rate is £1 = \$1.70

(b) Calculate how much Andrew will save by buying one 6-day ski pass in the sale rather than two 3-day ski passes.

(3)

3 - (4MB1/2_Winter_2019_Q4) - Number

(a) Express 56 as the product of its prime factors.

(1)

Trains to Watson leave Denby station every 56 minutes.

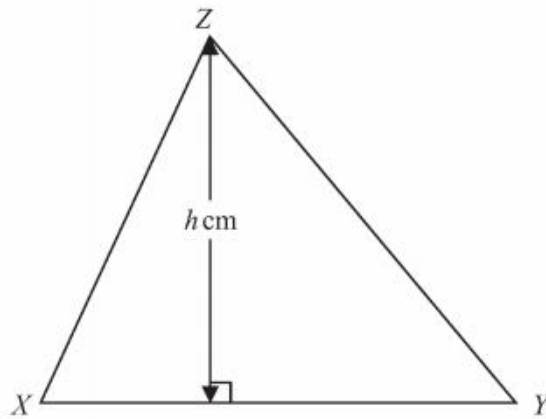
Trains to Barbe leave Denby station every 24 minutes.

A train to Watson and a train to Barbe both leave Denby station at 12 00.

(b) Find the next time that a train to Watson and a train to Barbe leave Denby station at the same time.

(3)

4 - (4MB1/2R_Winter_2019_Q1) - Number

Diagram **NOT**
accurately drawn**Figure 1**

In Figure 1, $\triangle XYZ$ has base XY and height h cm.

The length of XY is 7.2 cm, to 2 significant figures.

(a) Write down the lower bound for the length of XY .

(1)

The area of $\triangle XYZ$ is 29 cm^2 , to 2 significant figures.

(b) Write down the upper bound for the area of $\triangle XYZ$.

(1)

(c) Calculate, to 3 decimal places, the upper bound of h .

(2)

5 - (4MB1/2R_Winter_2019_Q3) - Number

Hugh and Pau are planning to sell ice creams at a charity event.

They buy enough ingredients to make exactly 270 ice creams.

Hugh and Pau make vanilla flavour, strawberry flavour and chocolate flavour ice creams. The numbers of vanilla flavour, strawberry flavour and chocolate flavour ice creams they make are in the ratios 2 : 3 : 4

(a) Calculate the number of chocolate flavour ice creams they make.

(3)

Hugh and Pau buy all the ingredients for the 270 ice creams at a total cost of £64.80

They calculate the selling price of each ice cream so that if they sell all 270 ice creams, they would make a profit of £1.20 on each ice cream.

(b) Calculate the percentage profit that Hugh and Pau would make if they sell all 270 ice creams at their calculated selling price.

(3)

At the charity event, Hugh and Pau sell $\frac{8}{9}$ of the 270 ice creams at their calculated selling price.

They then sell the remainder of the ice creams at half this selling price.

(c) Calculate the total profit, in pounds, that they make by selling all 270 ice creams.

(3)

ANSWERS

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1 - (4MB1/2_Summer_2019_Q2) - Number

(a)	$2.35 \times 10^7 \times 0.48$		2	M1 NB $2.35 \times 10^7 \times 48\%$ is not sufficient for this mark unless it leads to the correct answer. A1 Allow 1.13×10^7 oe eg 11.3×10^6
		1.128×10^7 or 11 280 000		
(b)	$\left(\frac{11\,280\,000}{10} \times 3\right)$		2	M1 A1 Allow answers between 3.38×10^6 and 3.39×10^6 inclusive must be in standard form. Allow a final answer of 3.4×10^6 if an acceptable value is seen not written in standard form.
		3.384×10^6		
(c)	"3 384 000" $\times 1.125$		2	M1 NB "3 384 000" $\times 112.5\%$ is not sufficient for this mark unless their answer is equal to their value $\times 1.125$ A1 Allow answers between 3.8×10^6 and 3.814×10^6 inclusive oe
		3.807×10^6 or 3 807 000		
(d)	$2.5 \times 10^7 \times 1.024 \times 0.976$		2	M1 A1 Allow answers between 24 986 000 and 24 990 000 inclusive oe ISW rounding.
		2.49856×10^7 or 24 985 600		

2 - (4MB1/2_Winter_2019_Q3) - Number

(a)	$\frac{272}{85} \times 100$			M1
		320	2	A1
(b)	220×1.7 or $\frac{272}{1.7}$			M1
	$220 \times 1.7 - 272$ or $220 - \frac{272}{1.7}$			M1
		\$102 or £60	3	A1

3 - (4MB1/2_Winter_2019_Q4) - Number

(a)		$2 \times 2 \times 2 \times 7$ or $2^3 \times 7$	1	B1
(b)	Method to find the LCM $2 \times 2 \times 2 \times 3$ or 56, 112, 168 and 24, 48, 72, 96, 120, 144, 168 or 12 00, 12 56, 13 52, 14 48 and 12 00, 12 24, 12 48, 13 12, 13 36, 14 05, 14 00, 14 24, 14 48 LCM = 168			M1
		14:48 or 2.48 pm	3	A1

4 - (4MB1/2R_Winter_2019_Q1) - Number

(a)		7.15 (cm)	1	B1
(b)		29.5 (cm ²)	1	B1
(c)	"29.5" \div (0.5 \times "7.15")		2	M1 "their (b)" \div (0.5 \times "their(a)") Or their (b) = (0.5 \times "their(a")) \times $\frac{1}{h}$ A1 cao
		8.252		

5 - (4MB1/2R_Winter_2019_Q3) - Number

(a)	$270 \div (2 + 3 + 4) (=30)$ 30×4	120	3	M1 M1 A1
(b)	$270 \times 1.2(0) (=324)$ or $64.8(0) \div 270 (=0.24)$ oe $324 + 64.8(0) \times 100$ or $1.2(0) \div 0.24 \times 100$ oe	500%	3	M1 M1 A1
(c)	$\frac{8}{9} \times 270 (= 240)$ or $\frac{1}{9} \times 270 (= 30)$ $240 \times 1.2(0) + 30 \times (0.5 \times (1.20 + \frac{64.80}{270})) - 30 \times \frac{64.80}{270}$	302.40	3	M1 M1 A1 allow 302.4

6 - (4MB1/2_Summer_2020_Q5) - Number

(a)	12.5×1.08 oe	(£)13.5(0)	2	M1 A1
(b)	$378 \div (5 + 3 + 1) (= 42)$ $5 \times \frac{378}{9} - \frac{378}{9}$ oe	168	3	M1 M1 or $210 - 42$
(c)	$(5 \times "42") \times \frac{3}{14}$ oe eg 3×15	45	2	M1 ft their 42 or their 210 in part(b) ie ("their 210") $\times \frac{3}{14}$ A1
(d)	$2.80 \times 1.24 [=(\$)3.47(2)]$ or $3.20 \div 1.24 [=(£)2.58...]$	The coffee is more expensive from the kiosk	2	M1 Allow for 3.47... or 2.58... if working not shown. Allow $n \times 2.80 \times 1.24$ and $n \times 3.2$ NB for $n = 210$ the figures are (\$)729.12 and (\$)672 Allow $m \times 3.20 \div 1.24$ and $m \times 2.80$ NB for $m = 210$ the figures are (£)541.94 and (£)588 A1 dep oe must have a correct conversion and comparison in words. eg the difference is (\$)0.27 or (\$)57.12 the difference is (£)0.22 or (£)46.06 NB the difference must be correct for these 2 statements. coffee is more expensive in UK, coffee is cheaper in the USA etc.
(e)	$5.28 \times 0.75 (= 3.96)$ $5.28 \times 0.75 + 1.24$ or "3.96" + 1.24	(£)3.19	3	M1 M1 A1 Ignore incorrect currency signs.
Total 12 marks				