Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

MATHEMATICS B   J567/03
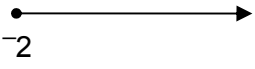
Paper 3 (Higher Tier)

Specimen Mark Scheme

The maximum mark for this Paper is **100**.

1	(a) Correct rotation to triangle with vertices (1, ‾2), (4, ‾2), (1, ‾4)	3	**B2** for rotation 90° anticlockwise about origin OR **B1** for rotation 90° clockwise about incorrect centre
	(b) Translation $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$	1 1	 Accept "2 right 1 up"
2	(a) 3 and ‾1	1	Both correct
	(b) Points correctly plotted Ruled line through (0, 7) and (4, ‾1)	1 1	ft *their* (a) Correct line only
	(c) 3·4 - 3·6	1	

SPECIMEN

3*	Complete correct calculation to find $18\frac{3}{8}$ pints required, and rounds up to 20. Indicates with correct and clear language that as the bottles have the same unit cost it does not matter which combination is chosen, and gives at least one combination for 20 pints.	6-5	For the lower mark, there may be one minor slip in the arithmetic at any stage, **or** weaker explanation. <u>Examples of combinations:</u> 6, 6, 6, 2 6, 6, 4, 4 6, 6, 2, 2, 2, 2 6, 4, 4, 4, 2 6, 4, 4, 2, 2, 2 6, 2, 2, 2, 2, 2, 2 4, 4, 2, 2, 2, 2, 2, 2 2, 2, 2, 2, 2, 2, 2, 2, 2, 2 <u>Example of working:</u> $1\frac{1}{2} = \frac{3}{2}$ and $1\frac{3}{4} = \frac{7}{4}$ $\frac{3}{2} \times \frac{7}{4} = \frac{21}{8}$ $\frac{21}{8} \times 7$ (days) $= \frac{147}{8}$ $18\frac{3}{8}$
	Correct method but incomplete or containing a minor error - but if followed without errors, would lead to $\frac{147}{8}$ or $18\frac{3}{8}$. Provides a brief comment saying that it does not matter which combination is chosen but without a clear reason. Gives a combination for *their* answer.	4-3	For the lower mark, more than one error is present in the working, **or** comment is missing or has several errors in spelling, punctuation and grammar, **or** no combination for *their* answer.
	Correctly converts both mixed numbers to improper fractions, or correctly multiplies one of the mixed numbers by 7 and attempts to multiply the result by the other fraction. Weak comment concerning the price of the bottles.	2-1	For the lower mark, as **2** but with errors in the conversion or in the multiplication, **or** limited comment which may have poor spelling, punctuation and grammar.
	No relevant calculations or comments.	0	

4	(a)(i) $h = \dfrac{P+5}{3}$ oe	2	**M1** $h = \dfrac{P-5}{3}$ or $h = \dfrac{P}{3} - 5$
	(ii) $h = \dfrac{T}{2} - w$ oe	2	**M1** $h = \dfrac{T-w}{2}$ or $h = \dfrac{T}{2} + w$ oe
	(b) $x \geq {}^-2$ and ${}^-2$	3	**M2** $x \geq {}^-2$ without correct diagram OR **M1** $6x - 2x \geq {}^-8$ or better **B1** ft *their* inequality correctly represented on the number line
5	(a) $\dfrac{20 \times 4}{0 \cdot 5} = 160$	2	**M1** Two of the three numbers correctly rounded to 1sf
	(b) Roughly 20×10^{22}	1	Condone 16×10^{22}
6	(a) $0 \cdot 55$	1	
	(b) $0 \cdot 2$	2	**M1** for $1 - (0 \cdot 25 + 0 \cdot 15 + 0 \cdot 4)$
7	(a) She is [extremely] unlikely to get the same result [because of a large number of combinations]	1	Accept any correct statement including 'she will **not** get the same results'
	(b) Not very close together, or not close to $0 \cdot 2$, or '2' occurs twice more than '1' Too few trials to be sure, or she needs to do more trials oe	1 1	Accept any correct statement Accept any correct statement 'More numbered balls' is not enough
8	(a) $108°$	2	**M1** $180° - (360° \div 5)$ Accept any correct method
	(b) $108°$ does not divide exactly into $360°$	1	Allow any equivalent correct statement
9	(a) All terms will be odd	1	Accept any valid statement
	(b) $6n + 1$	2	**M1** $6n$ seen

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10	(a) 2 × 2 × 2 × 5 or 2³ (×) 5	2	**M1** for attempt at factor tree/ladder or correct factor pair or better seen Or **SC1** for 2, 2, 2, 5 identified but not as product
	(b)(i) 8 cao	2	**B1** for 2 × 2 × 2 oe or answer of 2 or 4
	(ii) 120 cao	2	**B1** for 2 × 2 × 2 × 3 × 5 oe or a multiple of 120 **Or M1** for listing multiples of 24 AND 40 <u>After 0,0 in (b)</u> Award **SC2** in (b)(ii) for reversed answers
11	**(a)** 8640 × 0·15 (oe) or 1296 8640 − 'their 1296' 7344	M1 M1 A1	 **M1** 1 − 0·15 or 0·85 **M1** 8640 × 0·85
	(b) Yes, as it is [just] over 15 with correct working **Or** No, it is over 15 with correct working	3	**M1** Attempt to find 15% of 12800, eg 1280 and attempt to halve **B1** 1920 seen **B1** 2000 > 1920 and conclusion After 0, **SC1** for figs 192 seen Accept any equivalent method.
12	*a* = 280° *b* = 100°	1 2	 **M1** ∠PQO = ∠PRO = 90° **A1** ft 360° − (90° + 90° + 80°), or 360° − (90° +90°) + (360° − *their a*)
13	**(a)** Tree diagram complete	2	**M1** first or second set correct entries
	(b) 0·42	2	**M1** 0·7 × 0·6 or ft *their* tree diagram
14	<u>Finding PR:</u> 8 : 24 oe seen or used $13 \times \dfrac{24}{8}$ <u>Finding BC:</u> $54 \times \dfrac{8}{24}$ <u>Showing information:</u> 45° given as missing angle PR = 39 BC = 18 Complete list of required information, or completed labelled sketch, or missing information completed on given diagrams	B1 M1 M1 B1 A1 A1 B1	 Dependent on first M1 earned Dependent on second M1 earned

15	**(a)** Not enough information – oldest woman could be anywhere in the 50 to 99/100 interval	1	Do not accept "she was 100" oe
	(b) True - about 12 half squares so 120 000 women	2	**M1** allow for True with inadequate (but not wrong) justification
	(c) False - for age 50 to 100, women about 20 000, men 29 000	2	**M1** for true or false and 16 to 25, women about 40 000, men 21 000 seen
16	$y = {}^-2x + 8$	3	**M2** ^-2x OR **M1** for $\frac{6}{2}$ or (m) = 2 AND **W1** for +8 in equation
17	Graph translated right (5, 0) marked ($^-$1, 0) marked	1 1 1	**SC2** for graph translated left and ($^-$5, 0) and (1, 0) shown or **SC1** for graph translated left and either ($^-$5, 0) or (1, 0) shown
18	11 www	4	**M3** $5x = 60 - 7 + 2$ OR **M2** $3x + 7 + 2(x - 1) = 4 \times 15$ OR **M1** Multiplication by 4 or 8
19	8	2	**M1** $\frac{40}{1000} \times 200$ oe
20	$x = 7, y = {}^-1$	3	**M2** $\dfrac{a^7}{b}$ OR **M1** *their* $\dfrac{a^2}{b} \times a^7$ evaluated, or $\dfrac{a^2}{b}$
21	**(a)(i)** $^-2\mathbf{a} + 2\mathbf{b}$	1	
	(ii) $\mathbf{b} - \mathbf{a}$	1	
	(b) QS parallel to MN and double the length because QS = 2(**b** – **a**) = 2MN	2	**M1** QS parallel to MN and double the length, or for one statement with QS = 2(**b** – **a**)
22	**(a)** $(x + 5)^2 - 37$	3	**M2** $x^2 + 5x + 5x + 25$ OR **M1** $(x + 5)^2$ seen
	(b) $\dfrac{x - 5}{2}$	3	**M1** $(x - 5)(x + 5)$ AND **M1** $2(x + 5)$

23	**(a)** Slant height of cone = 4	**B1**	Accept *l* = 4
	Arc length = $4 \times 2\pi \times \frac{1}{4}$ [= 2π]	**M1**	
	Radius of cone = 1 (from $\frac{2\pi}{2\pi}$)	**B1**	
	Use of Pythagoras' theorem	**M1**	$h^2 + 1^2 = 4^2$ or better
	$h = \sqrt{15}$	**A1**	
	(b) Scale factor 2	**M1**	
	$2\sqrt{15}$ cao	**A1**	

Paper Total: 100 marks

Assessment Objectives and Functional Elements Grid

GCSE MATHEMATICS B

J567/03

Mathematics B Paper 3 (Higher Tier)

	Topic	**Context**	**Ref**	**AO1**	**AO2**	**AO3**	**Functional**
1	Transformations		HIG6	5			
2	Draw straight-line graph		HIA4	4			
3	Calculations with mixed numbers	Milk	HBN2			6	6
4	Change subject of formulae; solve inequality		HBA2 HBA3	7			
5	Estimate answer to calculation		HBN5 HSN3	3			
6	Mutually exclusive probability	Counters	HIS1		3		
7	Relative frequency	Lottery machine	HBS1		3		
8	Angle in pentagon; tessellating		HBG3	3			
9	Sequence		HBA1	3			
10	Prime factors, HCF, LCM		HBN6	6			
11	Percentages	Selling cars	HBN4		6		3
12	Geometrical calculation		HSG1	3			
13	Probability with tree diagram	Traffic lights	HSS1		4		2
14	Similar triangles	Company logo	HSG5		7		7
15	Interpreting table and histogram	Marriage statistics	HGS2 HGS3		5		5
16	Find equation of line		HSA7	3			
17	Transforming graph		HGA6	3			
18	Algebraic fraction equation		HSA1	4			
19	Stratified sampling	School	HGS4		2		2
20	Laws of indices		HGN1	3			
21	Vectors	Parallelogram	HGG5	2		2	
22	Completing the square; simplifying		HGA2, HSA2	6			
23	Mensuration of sectors and cones		HGG4			7	
	TOTAL			**55**	**30**	**15**	**25**

Paper Total: 100 marks