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9260/1E

Paper 1E

Mark scheme

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from oxfordaqa.org.uk

Key to mark types and abbreviations

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded for a common misinterpretation which has some mathematical worth.
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
[a, b)	Accept values $a \leqslant$ value $< b$
3.14…	Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416
Use of brackets	It is not necessary to see the bracketed work to award the marks.

Q	Answer	Mark	Comments
1	$\begin{pmatrix} -5 \\ 0 \end{pmatrix}$	B1	

Q	Answer	Mark	Comments
2	$1.08x$	B1	

Q	Answer	Mark	Comments
3	(0, 7)	B1	

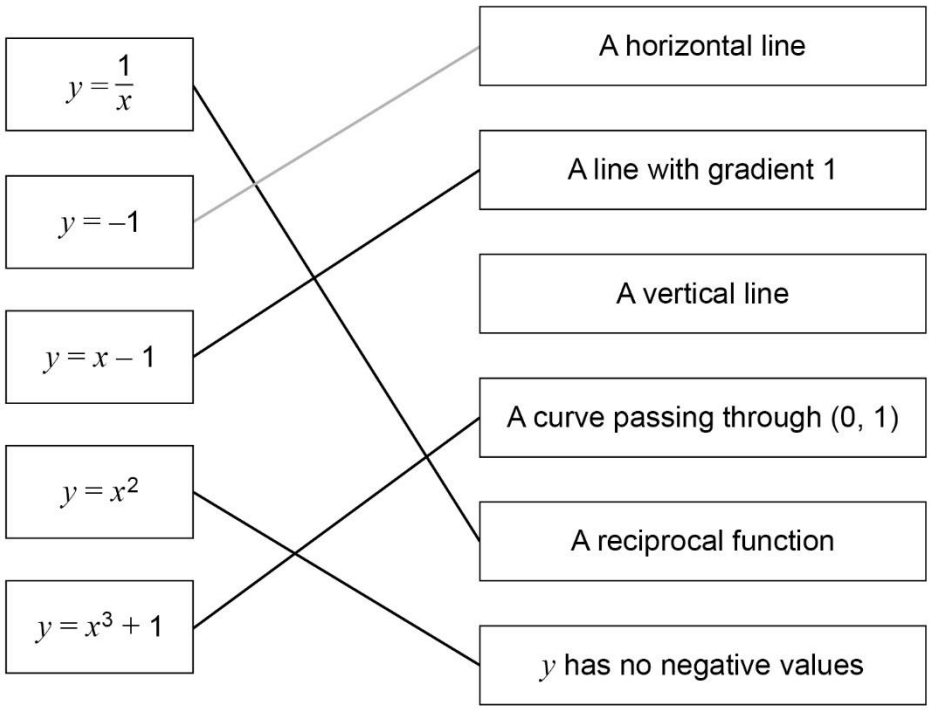
Q	Answer	Mark	Comments
4	18	B1	

Q	Answer	Mark	Comments
5	3.8×10^4 5.3×10^4 1.6×10^7 with no incorrect conversion seen	B2	B1 reverse order with no incorrect conversion seen or one correct conversion seen
	Additional Guidance		
	38 000 53 000 16 000 000	B2	
	Condone smallest 3.8×10^4 and largest 1.6×10^7 with no incorrect conversion seen (middle value implied)	B2	

Q	Answer	Mark	Comments
6(a)	$8n - 13$ or $-13 + 8n$	B2	oe eg $-5 + 8(n - 1)$ B1 $8n$ (…)
	Additional Guidance		
	Condone eg $T_n = 8n - 13$ or $n = 8n - 13$		B2
	Allow other variables eg $8x - 13$		B2
	$-5 + 8n$		B1
	$-13 + 8(n - 1)$		B1
	$n8$ …		B1
	$n8 - 13$		B1
	$13n - 8$		B0
	$8n - 13n$		B0
	$n - 8$		B0

Q	Answer	Mark	Comments
6(b)	$\frac{48-5^2}{5} + \frac{48-6^2}{6}$ or 4.6 or $\frac{23}{5}$ or $4\frac{3}{5}$ or 2	M1	oe
	6.6 or $\frac{33}{5}$ or $6\frac{3}{5}$	A1	

Q	Answer	Mark	Comments
7	$(6 - 2) \times 180$ or $\left(180 - \frac{360}{6}\right) \times 6$ or 720	M1	oe
	110	A1	
	Additional Guidance		
	720 embedded eg $\frac{720}{5}$		M1A0
	$(6 - 2) \times 180$ embedded		M1A0

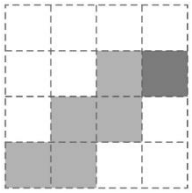
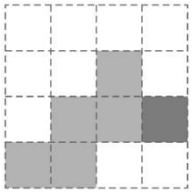
<table>
<tr><th>Q</th><th>Answer</th><th>Mark</th><th>Comments</th></tr>
<tr><td rowspan="3">8</td><td>$y = \frac{1}{x}$ → A reciprocal function
$y = x - 1$ → A line with gradient 1
$y = x^2$ → y has no negative values
$y = x^3 + 1$ → A curve passing through (0, 1)</td><td>B4</td><td>B1 each correct match</td></tr>
<tr><td colspan="3">Additional Guidance</td></tr>
<tr><td colspan="2"> 
</td><td>B4</td></tr>
<tr><td colspan="2">Two lines from an equation is choice</td><td></td></tr>
</table>

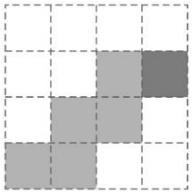
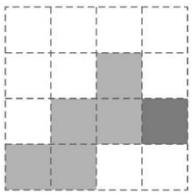
Q	Answer	Mark	Comments
9	(1 ×) 66 + 3 × 26 + 5 × 20 + 7 × 8 or 66 + 78 + 100 + 56 or 300	M1	may be seen in table allow one error
	(their 66 + their 78 + their 100 + their 56) ÷ 120 or their 300 ÷ 120 or 2.5	M1dep	oe condone bracket error if working seen eg 66 + 78 + 100 + 56 ÷ 120
	2 hours 30 minutes	A1	SC2 244 hours 28 minutes SC1 244.4$\dot{6}$
	Additional Guidance		
	One error may be a consistent error in the midpoints eg using 2, 4, 6 and 8		
	Correct products and sum seen in the table but a different method not using their products is choice		M0M0A0

Q	Answer	Mark	Comments
10(a)	25	B1	

Q	Answer	Mark	Comments
10(b)	24 36 48 with no extras	B2	B1 three correct with one extra or two correct with no more than one extra or one correct with no extras
	Additional Guidance		
	Allow set notation for B2 or B1 eg {24, 36, 48}		B2
	Only 24, 36, 48 listed, Answer 3		B1

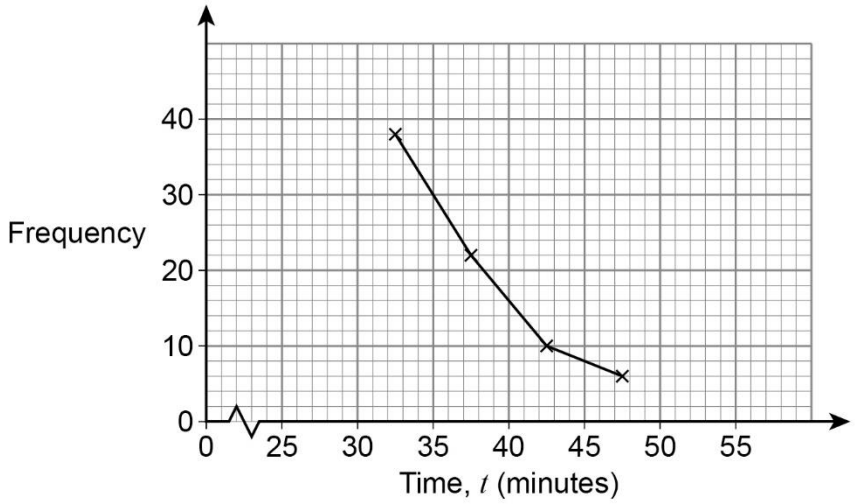
Q	Answer	Mark	Comments
10(c)	12 14 15 16 18 with no extras	B2	B1 five correct with one extra or four correct with no more than one extra or three correct with no extras SC1 11 13 17 19
	Additional Guidance		
	Allow set notation for B2 or B1 eg {12, 14, 15, 16, 18}		B2
	Only 12, 14, 15, 16, 18 listed, Answer 5		B1

Q	Answer	Mark	Comments
11(a)	 or 	B1	mark intention

Q	Answer	Mark	Comments
11(b)	 or 	B1	must be different to part (a) mark intention

Q	Answer	Mark	Comments
12(a)	**Alternative method 1**		
	$\frac{2w}{w+15} = \frac{1}{2}$ and $w = 5$	B1	oe equation and $w = 5$
	Alternative method 2		
	$\cos 60 = \frac{10}{20}$	B1	
	Alternative method 3		
	$\cos x = \frac{10}{20}$ and $(x =)\ 60$	B1	any letter other than w
	Additional Guidance		
	$\cos 60 = \frac{2\times5}{5+15}$ and $\cos 60 = \frac{1}{2}$		B1
	Allow embedded eg $\cos 60 = \frac{2\times5}{5+15}$		B1
	$\cos 60 = \frac{1}{2}$ with no further working		B0

Q	Answer	Mark	Comments
12(b)	10^2 or 100 **and** 20^2 or 400 or 300	M1	oe eg $(2 \times 5)^2$ **and** $(5 + 15)^2$ allow $(2w)^2$ oe **and** $(w + 15)^2$ oe
	$\sqrt{20^2 - 10^2}$ or $\sqrt{400 - 100}$	M1dep	oe
	[17.3, 17.321] or $\sqrt{300}$ or $10\sqrt{3}$	A1	accept 17 with M1 awarded
	Additional Guidance		
	Answer only		M1M1A1
	Answer from drawing		M0M0A0
	Answer from trigonometry		M0M0A0
	Allow recovery of brackets eg1 $5 + 15^2 - 2 \times 5^2$ with no recovery eg2 $5 + 15^2 - 2 \times 5^2 = 20^2 - 10^2$		 M0 M1
	2nd M1 must substitute $w = 5$ eg1 $\sqrt{w^2 + 30w + 225 - 4w^2}$ with no substitution seen or implied eg2 $\sqrt{w^2 + 30w + 225 - 4w^2} = \sqrt{25 + 150 + 225 - 100}$		 M1M0A0 M1M1

Q	Answer	Mark	Comments
13(a)	Three or four of (32.5, 38), (37.5, 22), (42.5, 10), (47.5, 6) correctly plotted or four points with correct frequencies consistently positioned at or between the class boundaries	M1	$\pm \frac{1}{2}$ small square
	(32.5, 38), (37.5, 22), (42.5, 10) and (47.5, 6) correctly plotted and joined with straight lines to form a frequency polygon	A1	$\pm \frac{1}{2}$ small square
	Additional Guidance		
			M1A1
	Mark intention for straight lines		
	Ignore (32.5, 38) joined to (0, 0) or to (25, 0) or to (27.5, 0) or to (30, 0) and ignore (47.5, 6) joined to (50, 0) or to (52.5, 0) or to (55, 0) but any other extra lines score A0		
	Extra points may be ignored if not used to make the polygon		
	Plots (30, 38), (35, 22), (40, 10), (45, 6) ie all points plotted at lower boundaries		M1
	Plots (30, 38), (35, 22), (40, 10), (50, 6) ie three points plotted at lower boundaries and one at upper boundary		M0
	Histogram and frequency polygon, mark the frequency polygon		
	Histogram only		M0A0

Q	Answer	Mark	Comments
13(b)	**Alternative method 1**		
	$1 - 0.05$ or 0.95 or $100(\%) - 5\%$ or 95%	M1	oe may be implied by $\div 95 \times 100$
	$76 \div$ their 0.95	M1dep	oe
	80	A1	
	Alternative method 2		
	$\frac{x}{x+76} = 0.05$	M1	oe where x is the number who did not finish any letter
	$0.95x = 3.8$ or $x = 4$	M1dep	oe
	80	A1	
	Additional Guidance		
	Answer 80 coming from $76 + 0.05 \times 76$ or 1.05×76 or $76 + 3.8$		M0M0A0
	80 seen, Answer 4		M1M1A0

Q	Answer	Mark	Comments
14	$600\,000\,\text{cm}^3$	B1	

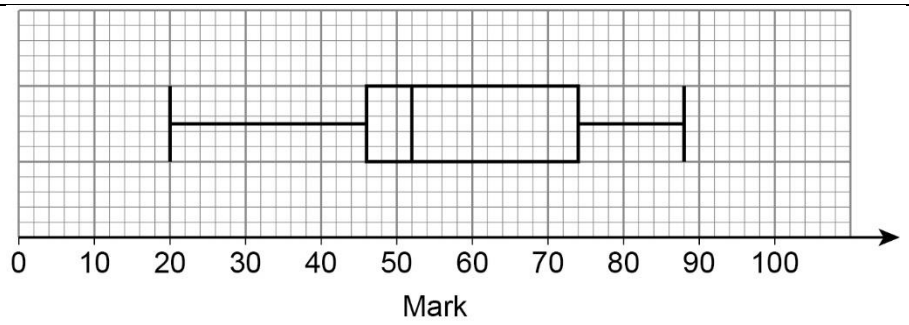
Q	Answer	Mark	Comments
15(a)	$0.4 \times (16 + 6.5) + 5$	M1	oe
	14	A1	

Q	Answer	Mark	Comments
15(b)	$17.5 = 0.4 \times (22 + N) + 5$ or $(N =) \frac{R-5}{0.4} - L$	M1	
	$\frac{17.5-5}{0.4} = 22 + N$ or $17.5 - 5 - 0.4 \times 22 = 0.4N$ or $(N =) \frac{17.5-5}{0.4} - 22$	M1dep	oe correct rearrangement up to $N + 22 =$ or $0.4N =$
	9.25 or $\frac{37}{4}$ or $9\frac{1}{4}$	A1	
	Additional Guidance		
	Allow negative equivalents eg $-0.4N = 0.4 \times 22 - 17.5 + 5$		M1M1

Q	Answer	Mark	Comments
16	**Alternative method 1**		
	$\sqrt{75.69}$ or 8.7	M1	
	4 – 1 or 3	M1	may be implied by $\frac{1}{3}$ or $\frac{4}{3}$
	their 8.7 ÷ 3 or 2.9 or their 8.7 ÷ 3 × 4 or 11.6	M1dep	dep on M1M1
	33.64	A1	oe
	Alternative method 2		
	$\sqrt{75.69}$ or 8.7	M1	
	their 8.7 + x = 4x or their 8.7 + $\frac{y}{4} = y$	M1dep	oe x is the smaller side of a rectangle y is the longer side of a rectangle any letter
	their 8.7 ÷ 3 or 2.9 or their 8.7 ÷ 3 × 4 or 11.6	M1dep	
	33.64	A1	oe
	Alternative method 3		
	3 : 5 or 5 : 3	M1	ratio of sides of squares
	$3^2 : 5^2$ or 9 : 25 or $5^2 : 3^2$ or 25 : 9	M1dep	ratio of areas of squares may be implied by 210.25
	75.69 ÷ their 9 × their 25 – 75.69 or 210.25 – 75.69 or 134.56	M1dep	oe
	33.64	A1	oe

Mark scheme continues on the next page

Q	Answer	Mark	Comments
16 cont	**Alternative method 4**		
	$4 - 1$ or 3	M1	may be implied by $9x^2$
	$9x^2 = 75.69$	M1dep	oe
	$\sqrt{75.69 \div 9}$ or 2.9 or $\sqrt{75.69 \div 9} \times 4$ or 11.6	M1dep	oe $75.69 \div 9 \times 4$ is M3
	33.64	A1	oe

Q	Answer	Mark	Comments
17(a)	Box plot drawn with lowest at 20 highest at 88 median at 52 upper quartile at 74 lower quartile at 46	B3	$\pm\frac{1}{2}$ square B2 box plot drawn with four of lowest at 20 highest at 88 median at 52 upper quartile at 74 lower quartile at 46 B1 46 seen or indicated
	Additional Guidance		
			B3
	Box plot must have two whiskers and a central box with no more than one vertical division for B2 or B3		
	Mark intention eg the box can be any height		
	Allow ends of whiskers to be lines of any length, dots, crosses or missing		
	For the B1, 46 must be indicated in this part of the question		

Q	Answer	Mark	Comments
17(b)	Class B	B1	
	Class A	B1	
	Class A	B1	
	Additional Guidance		
	Any indication		
	If a tick and cross(es) in each row, the tick counts as the correct answer		

Q	Answer	Mark	Comments
18	$a = 36$	B1	
	$b = -24$	B1ft	ft $12 -$ their a
	$c = -8$	B1ft	ft their $b \div 3$
	Additional Guidance		
	Condone non-integer values of b and c for follow through		
	$a = 13 \quad b = -1 \quad c = -\frac{1}{3}$		B0B1ftB1ft
	$a = 36 \quad b = 48 \quad c = 16$		B1B0B1ft

Q	Answer	Mark	Comments
19	**Alternative method 1**		
	$-1 \div \frac{1}{2}$ or -2	M1	oe implied by $y = -2x + c$
	3 = their $-2 \times 4 + c$ or $c = 11$	M1dep	oe
	$y = -2x + 11$	A1	
	Alternative method 2		
	$-1 \div \frac{1}{2}$ or -2	M1	oe implied by $y = -2x + c$
	$y - 3$ = their $-2(x - 4)$ or $y - 3 = -2x + 8$	M1dep	oe
	$y = -2x + 11$	A1	
	Additional Guidance		
	Allow $y = -2 \times x + 11$		
	$-2x + 11$ on answer line, $y = -2x + 11$ seen in working		M1M1A1
	$-2x + 11$ on answer line, $y = -2x + 11$ not seen in working		M1M1A0
	$m = -2$, $c = 11$ on answer line, $y = -2x + 11$ seen in working		M1M1A1
	$m = -2$, $c = 11$		M1M1A0
	$y = -2x + 1$		M1
	$y = -2x$		M1

Q	Answer	Mark	Comments
20	$\frac{4}{3}\pi r^3 = 6r^2$	M1	oe
	$\frac{4}{3}\pi r = 6$ or $4\pi r = 18$ or $4.5 \div \pi$	M1dep	oe equation in r or $\frac{1}{r}$ allow 1.43…
	$\frac{18}{4\pi}$ or $\frac{9}{2\pi}$ or $\frac{4.5}{\pi}$	A1	oe in terms of π allow [0.455, 0.46]π or $\frac{6}{\frac{4}{3}\pi}$ or $\frac{1}{\frac{2}{9}\pi}$
	Additional guidance		
	Ignore incorrect simplification or conversion once correct answer seen		M1M1A1

Q	Answer	Mark	Comments
21	**Alternative method 1** Expanding numerator		
	$3n^2 - n$ or $3n^2 + n$	M1	
	$\frac{3n^2 - n + 3n^2 + n}{6}$ or $\frac{3n^2 - n}{6} + \frac{3n^2 + n}{6}$	M1dep	
	$\frac{6n^2}{6} = n^2$ with M2 seen	A1	
	Alternative method 2 Factorising numerator		
	$\frac{n(3n - 1 + 3n + 1)}{6}$	M1	factor of n
	$\frac{n(6n)}{6}$ or $\frac{6n^2}{6}$ with M1 seen	M1dep	
	n^2 with M2 seen	A1	
	Additional Guidance		
	Accept $1n$ for n and $1n^2$ for n^2		
	Common denominators other than 6 may be used eg denominator of 36 $\frac{18n^2 - 6n}{36}$ or $\frac{18n^2 + 6n}{36}$ $\frac{18n^2 - 6n + 18n^2 + 6n}{36}$ $\frac{36n^2}{36} = n^2$ or $\frac{36n^2}{36} = \left(\frac{6n}{6}\right)^2$	 M1 M1dep A1	

Q	Answer	Mark	Comments
22	Enlargement scale factor -2 (centre (0, 0))	B2	B1 enlargement (centre (0, 0)) or scale factor -2
	Additional Guidance		
	Allow any unambiguous indication of (0, 0)		
	Combination of transformations		B0

Q	Answer	Mark	Comments
23	**Alternative method 1**		
	$v = k\sqrt{h}$ or $3.52 = k \times \sqrt{0.64}$ or $3.52 \div \sqrt{0.64}$	M1	oe any letter
	$(k =)$ 4.4 or $v = 4.4\sqrt{h}$	A1	oe eg $(k =) \frac{22}{5}$ implied by 1.6 oe
	$(7.04 \div \text{their } 4.4)^2$	M1dep	oe eg 1.6^2 oe $(7.04 \div 4.4)^2$ oe implies M1A1M1
	2.56	A1ft	oe ft their k
	Alternative method 2		
	$cv = \sqrt{h}$ or $c \times 3.52 = \sqrt{0.64}$ or $\sqrt{0.64} \div 3.52$	M1	oe any letter
	$(c =) \frac{5}{22}$ or 0.227(27…) or 0.23 or $\frac{5}{22}v = \sqrt{h}$	A1	oe implied by 1.6 oe
	$\left(\text{their } \frac{5}{22} \times 7.04\right)^2$	M1dep	oe eg 1.6^2 oe $\left(\frac{5}{22} \times 7.04\right)^2$ oe implies M1A1M1
	2.56	A1ft	oe ft their c
	Additional Guidance		
	$v \propto \sqrt{h}$ or $3.52 \propto \sqrt{0.64}$ oe is not sufficient for first M mark		
	Their follow through must be correct to 2 significant figures or better		

Q	Answer	Mark	Comments
24	$\frac{1}{2} \times 12.9 \times 9.8 \times \sin A$ (= 61.5)	M1	oe
	(sin A =) (61.5 × 2) ÷ (9.8 × 12.9) or (sin A =) [0.97, 0.973] or (A =) [75.9, 77]	M1dep	oe
	$12.9^2 + 9.8^2 -$ (2 × 12.9 × 9.8 × cos (their [75.9, 77]) or [200.8, 205.6]	M1	oe their [75.9, 77] can be any angle except 90°
	$\sqrt{\text{their [200.8, 205.6]}}$	M1dep	dep on 3rd M1
	[14.24, 14.34]	A1	

Q	Answer	Mark	Comments
25	$\frac{15x^2 + 10x}{8}$	B4	B3 $\frac{5x}{4} \times \frac{(3x+2)}{2}$ or $\frac{5x(3x+2)}{8}$ or $\frac{x(15x+10)}{8}$ or $\frac{45x^2+30x}{24}$ or $\frac{15x^3+10x^2}{8x}$ B2 $\frac{5x^2}{12} \times \frac{3(3x+2)}{2x}$ or $\frac{15x^2(3x+2)}{24x}$ or $\frac{45x^3+30x^2}{24x}$ or $\frac{15x(3x+2)}{24}$ or $\frac{5x}{12} \times \frac{9x+6}{2}$ or $\frac{5x(9x+6)}{24}$ B1 $\frac{5x^2}{12} \times \frac{9x+6}{2x}$ or $\frac{5x^2(9x+6)}{24x}$ or ($9x + 6$ =) $3(3x + 2)$
	Additional Guidance		
	Correct answer followed by further work		B3

Q	Answer	Mark	Comments
26(a)	$f(x) \geqslant 0$	B1	

Q	Answer	Mark	Comments
26(b)	$y^2 = x - 1$ or $y^2 + 1 = x$ or $x^2 = y - 1$	M1	allow use of other letters for y
	$x^2 + 1$	A1	
	Additional Guidance		
	Condone $f^{-1}(x) = x^2 + 1$ or $y = x^2 + 1$ or $f^{-1} = x^2 + 1$ or $f = x^2 + 1$		

Q	Answer	Mark	Comments
26(c)	**Alternative method 1**		
	$\sqrt{x^2 + 6x + 10 - 1}$ or $\sqrt{4^2 + 6 \times 4 + 10 - 1}$ or $\sqrt{49}$	M1	oe eg $\sqrt{(x+3)^2 + 1 - 1}$
	7	A1	
	Alternative method 2		
	16 + 24 + 10 or 50 and $\sqrt{\text{their } 50 - 1}$ or $\sqrt{49}$	M1	oe
	7	A1	
	Additional Guidance		
	Answer ± 7		M1A0
	$\sqrt{4^2 + 6(4) + 10 - 1}$		M1

Q	Answer	Mark	Comments
27	**Alternative method 1** Working with 0.154…		
	$10x = 1.54(54…)$ or $100x = 15.45(45…)$ or $1000x = 154.54(54…)$	M1	oe multiplication by a power of 10 any letter
	$1000x - 10x = 154.54(54…) - 1.54(54…)$ or $990x = 153$ with $1000x = 154.54(54…)$ and $10x = 1.54(54…)$ seen or $100x - x = 15.45(45…) - 0.1545(45…)$ or $99x = 15.3$ with $100x = 15.45(45…)$ seen	M1dep	oe subtraction to eliminate recurring digits
	$\frac{153}{990} = \frac{17}{110}$ or $\frac{15.3}{99} = \frac{17}{110}$	A1	working for M2 must be shown

Mark scheme and Additional Guidance continue on the next page

Q	Answer	Mark	Comments
27 cont	**Alternative method 2** Working with 0.054…		
	$10x = 0.54(54\ldots)$ or $100x = 5.45(45\ldots)$ or $1000x = 54.54(54\ldots)$	M1	oe multiplication by a power of 10 any letter
	$1000x - 10x = 54.54(54\ldots) - 0.54(54\ldots)$ or $990x = 54$ with $1000x = 54.54(54\ldots)$ and $10x = 0.54(54\ldots)$ seen or $100x - x = 5.45(45\ldots) - 0.054(54\ldots)$ or $99x = 5.4$ with $100x = 5.45(45\ldots)$ seen	M1dep	oe subtraction to eliminate recurring digits
	$\frac{54}{990} + \frac{1}{10} = \frac{17}{110}$ or $\frac{5.4}{99} + \frac{1}{10} = \frac{17}{110}$	A1	working for M2 must be shown
	Additional Guidance		
	Use of x may be implied eg $100 \times 0.154(5\ldots) = 15.45(45\ldots)$ $99 \times 0.154(5\ldots) = 15.3$		M1 M1
	For the A mark in Alt 2 accept equivalent fractions for $\frac{54}{990}$ or $\frac{5.4}{99}$		

Q	Answer	Mark	Comments
28	$-5\mathbf{a} - 3\mathbf{b} + 11\mathbf{a} - \mathbf{b}$ or $6\mathbf{a} - 4\mathbf{b}$ or $5\mathbf{a} + 3\mathbf{b} - 11\mathbf{a} + \mathbf{b}$ or $-6\mathbf{a} + 4\mathbf{b}$	M1	oe may be on the diagram
	$\frac{k}{\text{their } 6} = \frac{-12}{\text{their} - 4}$ or k : their 6 = –12 : their –4 or –12 × their 6 ÷ their –4 or $18\mathbf{a}$ ($-12\mathbf{b}$) or $3(6\mathbf{a} - 4\mathbf{b})$	M1dep	oe ft their $6\mathbf{a} - 4\mathbf{b}$ must be of the form $n\mathbf{a} + m\mathbf{b}$ but not $5\mathbf{a} + 3\mathbf{b}$ or $11\mathbf{a} - \mathbf{b}$
	18	A1ft	ft M0M1
	Additional Guidance		
	$18\mathbf{a}$		M1M1A0
	$-5\mathbf{a} - 3\mathbf{b} + 11\mathbf{a} - \mathbf{b} = 6\mathbf{a} - 2\mathbf{b}$ with answer 36		M1M1A0
	$6\mathbf{a} + 2\mathbf{b}$, Answer –36		M0M1A1ft
	$6\mathbf{a} + 2\mathbf{b}$, Answer 36		M0M1A0ft

Q	Answer	Mark	Comments
29	Car A travels the greatest distance	B1	

Q	Answer	Mark	Comments
30	11.5 or 12.5 or 949.5 or 950.5	B1	oe implied by 805 or 875
	their 950.5 – 70 × their 11.5	M1	oe 950 < their 950.5 < 951 11 < their 11.5 < 12
	145.5 with 11.5 and 950.5 used	A1	
	Additional Guidance		
	Accept $12.4\dot{9}$ for 12.5 and $950.4\dot{9}$ for 950.5		
	950 – 70 ×12		M0

Q	Answer	Mark	Comments
31	$\frac{2}{6} \times \frac{1}{5}$ or $\frac{2}{30}$ or $\frac{3}{6} \times \frac{2}{5}$ or $\frac{6}{30}$	M1	oe fraction, decimal or percentage
	$\frac{2}{6} \times \frac{1}{5} + \frac{3}{6} \times \frac{2}{5}$ or $\frac{2}{30} + \frac{6}{30}$	M1dep	oe fraction, decimal or percentage
	$\frac{8}{30}$ or $\frac{4}{15}$	A1	oe fraction, decimal or percentage SC1 full unambiguous list of all possible outcomes shown
	Additional Guidance		
	$\frac{1}{5}$ with no evidence of $\frac{3}{6}$ (×) $\frac{2}{5}$		M0

Q	Answer	Mark	Comments
32	**Alternative method 1**		
	$3.5 = A \times k^0$	M1	
	$A = 3.5$	A1	
	$1.75 = 3.5 \times k^{-1}$	M1	oe implies M1A1M1
	$A = 3.5$ and $k = 2$	A1	
	Alternative method 2		
	$1.75 = A \times k^{-1}$	M1	
	$k = 2$ or $k = \frac{3.5}{1.75}$	A1	
	$3.5 = A \times 2^0$ or $1.75 = A \times 2^{-1}$	M1	oe implies M1A1M1
	$A = 3.5$ and $k = 2$	A1	