



Independent Schools
Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

MATHEMATICS

LEVEL 2 MARK SCHEME

This is a suggested, not a prescriptive, mark scheme.

Spring 2018

The majority of answers are worth two marks.

Award M: 1 A: 1 unless otherwise stated.

It is suggested that the following grade boundaries be applied:

A or A* = 70% +

B = 55% +

C = 40% +

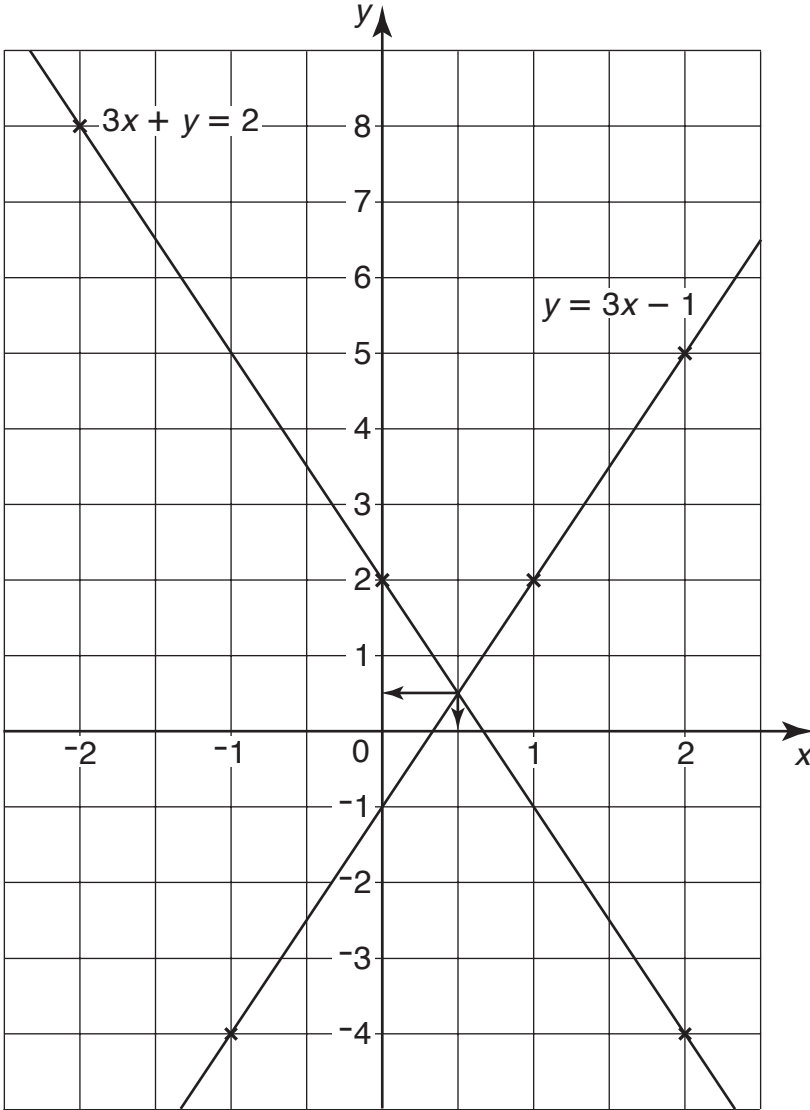
D = 25% +

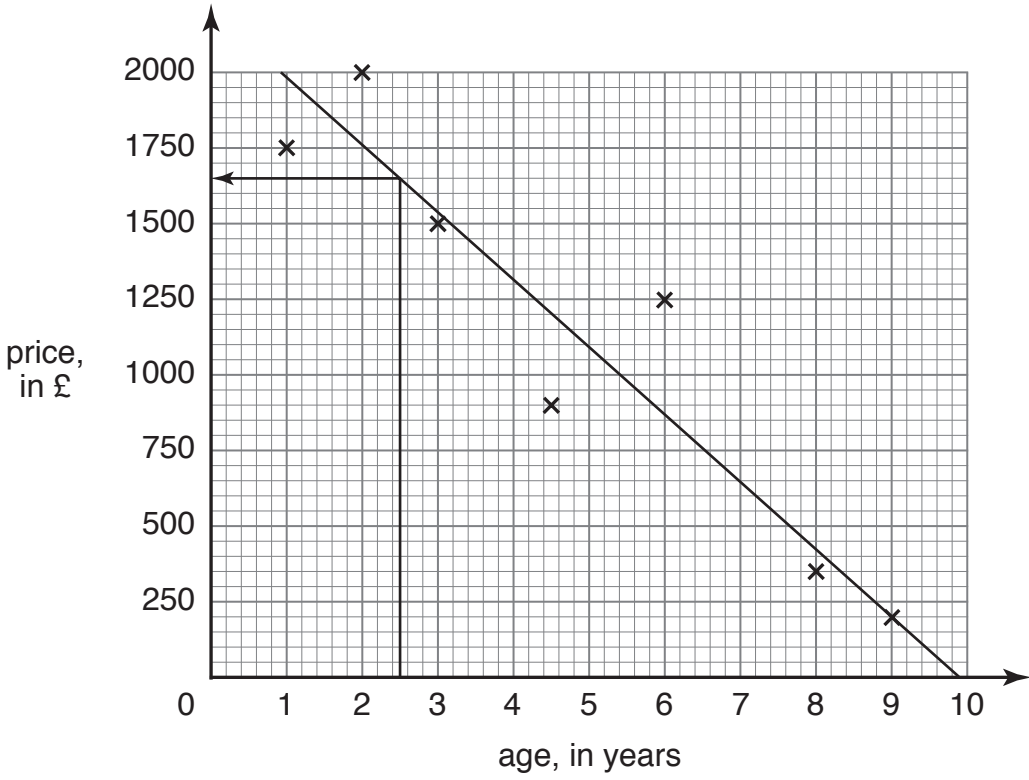


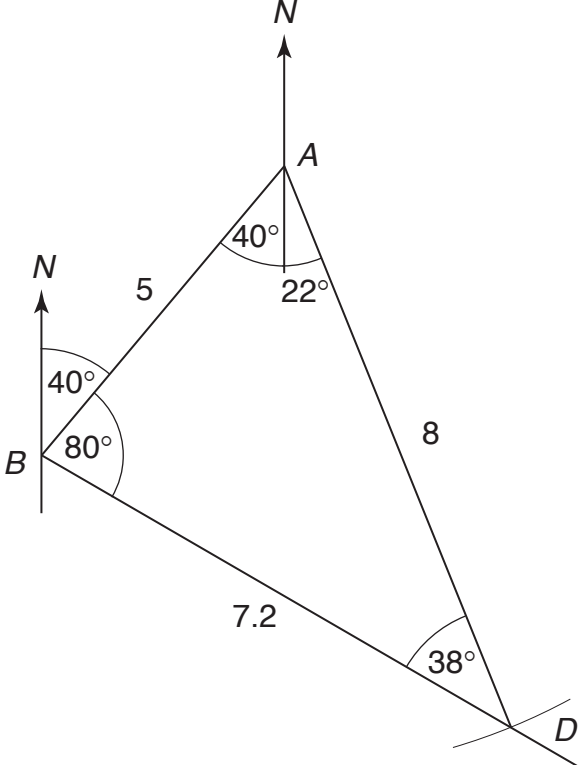
LEVEL 2: NON-CALCULATOR

Q.	Answer	Mark	Additional Guidance
1. (i)	£11.22	2	
(ii)	£16.06	2	
(iii)	£5.85	2	
(iv)	£1.34	2	
2.	the 150 ml tube is better value	3	M: 1 A: 1 for 1.65 or 1.08 A: 1 for answer provided working shown
3. (i)	$2 \times 3^3 \times 5$	3	M: 1 for two of 2, 3, 5 A: 1 for $2 \times 3 \times 3 \times 3 \times 5$ A: 1 for answer
(ii)	100	2	M: 1 for $2^2 \times 5^2$ A: 1 for answer
4. (a) (i)	0.155	1	A: 1
(ii)	15.5% $0.1\dot{5}$ $\frac{4}{25}$	2	M: 1 for $\frac{16}{100}$ or $0.1\dot{5} > 15.5\%$ A: 1 for order
(b) (i)	990	2	M: 1 for 66×15 or 900 or 90 A: 1 for answer
(ii)	50%	3	A: 1 for 160 M: 1 for 1150 out of 2300 A: 1 for answer
5. (i)	19	2	M: 1 for 2×9 A: 1 for answer
(ii)	32	2	M: 1 for 64 A: 1 for answer

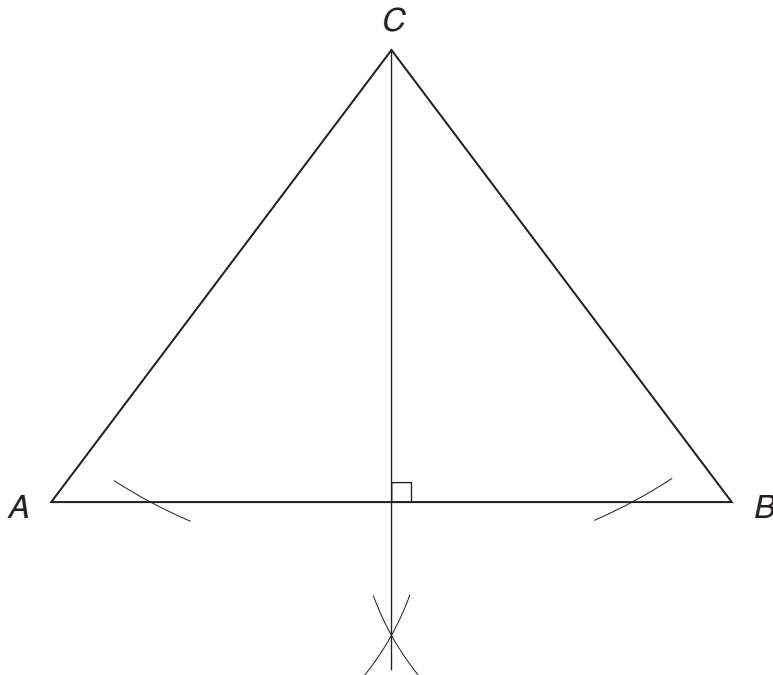
Q.	Answer	Mark	Additional Guidance
6. (i)	18	2	M: 1 for 20 or -2 A: 1 for answer
(ii)	-20	2	M: 1 for $2 \times -(5 \times 2)$ A: 1 for answer
(iii)	3	2	M: 1 for +2 or + 1 A: 1 for answer
(iv)	4	2	M: 1 for 8 or $(x + y)$ A: 1 for answer
7. (i)	$3\frac{19}{20}$ kg	3	M: 1 for $3 + \frac{1}{5} + \frac{3}{4}$ A: 1 for $\frac{4}{20}$ or $\frac{15}{20}$ A: 1 for answer
(ii)	$\frac{11}{12}$ kg	2	M: 1 for $\frac{11}{4} \div 3$ A: 1 for answer
(iii)	12 days	2	M: 1 for $\frac{6}{5} \times 10$ or $\frac{6}{5} = \frac{12}{10}$ A: 1 for answer
8. (a) (i)	$a = 72$	2	M: 1 for 24×3 A: 1 for answer
(ii)	$b = 7$	2	M: 1 for $5b = 35$ or $b - 3 = 4$ A: 1 for answer
(iii)	$c = -5$	2	M: 1 for $-3 = c + 2$ or $-6 = 2c + 4$ A: 1 for answer
(b)	$d = 3.5$ or equivalent	2	M: 1 for $3d - 3 = d + 4$ A: 1 for answer

Q.	Answer	Mark	Additional Guidance								
9. (i) (a)	<table border="1"> <tr> <td>x</td><td>-1</td><td>1</td><td>2</td></tr> <tr> <td>y</td><td>-4</td><td>2</td><td>5</td></tr> </table>	x	-1	1	2	y	-4	2	5	2	A: 1 for -4 A: 1 for 5
x	-1	1	2								
y	-4	2	5								
(b)		2	A: 1 for plot A: 1 for line and label								
(ii) (a)	<table border="1"> <tr> <td>x</td><td>-2</td><td>0</td><td>2</td></tr> <tr> <td>y</td><td>8</td><td>2</td><td>-4</td></tr> </table>	x	-2	0	2	y	8	2	-4	2	A: 1 for 0 A: 1 for 8
x	-2	0	2								
y	8	2	-4								
(b)	$3x + y = 2$	1	A: 1								
(iii)	$(\frac{1}{2}, \frac{1}{2})$	1	A: 1								

Q.	Answer	Mark	Additional Guidance
10. (i)	1836	1	A: 1
(ii)	183.6	1	A: 1
(iii)	108	2	M: 1 for $\div 2$ A: 1 for answer
11. (i) (a)	$a = 38^\circ$	1	A: 1
(b)	(no) reason: $a \neq 48^\circ$ or $142^\circ + 48^\circ \neq 180^\circ$	1	A: 1
(ii)	$c = 55^\circ$	2	A: 1 for $65 + 65 + 90 + 85 = 305$ A: 1 for answer
12. (i)	 price, in £ age, in years		
	2 points	2	A: 1 for each
(ii)	line of best fit	1	A: 1
(iii)	the older the motorcycle the less it costs <i>or equivalent</i>	1	A: 1
(iv)	£1650	2	allow sensible answer

Q.	Answer	Mark	Additional Guidance
13. (i)	 040° or equivalent	1	A: 1
(ii) (a)	5 cm	1	A: 1
(b)	2.0 km	1	A: 1
(iii) (a)	<i>D</i>	2	A: 1 for 120° A: 1 for 8 cm arc
(b)	2.9 km or 2.88 km	2	A: 1 for 7.2 cm A: 1 for answer allow 2.80–2.96

Q.	Answer	Mark	Additional Guidance																																							
14. (i)	<table><tr><th>starter</th><th>main course</th><th>dessert</th></tr><tr><td>S</td><td>B</td><td>I</td></tr><tr><td>S</td><td>B</td><td>R</td></tr><tr><td>S</td><td>P</td><td>I</td></tr><tr><td>S</td><td>P</td><td>R</td></tr><tr><td>S</td><td>C</td><td>I</td></tr><tr><td>S</td><td>C</td><td>R</td></tr><tr><td>M</td><td>B</td><td>I</td></tr><tr><td>M</td><td>B</td><td>R</td></tr><tr><td>M</td><td>P</td><td>I</td></tr><tr><td>M</td><td>P</td><td>R</td></tr><tr><td>M</td><td>C</td><td>I</td></tr><tr><td>M</td><td>C</td><td>R</td></tr></table>	starter	main course	dessert	S	B	I	S	B	R	S	P	I	S	P	R	S	C	I	S	C	R	M	B	I	M	B	R	M	P	I	M	P	R	M	C	I	M	C	R		
	starter	main course	dessert																																							
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	M	C	I																																							
	M	C	R																																							
			2	A: 2 A: 1 off for each error																																						
(ii) (a)	$\frac{1}{3}$	1	A: 1 accept $\frac{4}{12}$																																							
(b)	$\frac{1}{6}$	1	A: 1 accept $\frac{2}{12}$																																							
(c)	$\frac{1}{4}$	1	A: 1 accept $\frac{3}{12}$																																							
(iii)	$\frac{1}{4}$	2	M: 1 for 2 from 8 A: 1 for answer																																							

Q.	Answer	Mark	Additional Guidance																				
15. (i)	isosceles	1	A: 1																				
(ii)	 perpendicular from C to AB			2																			
(iii)	6 cm	1	A: 1 allow 5.9–6.1																				
(iv)	27 cm^2	2	M: 1 for $\frac{1}{2} \times 9 \times 6$ A: 1 for answer allow 26.4–27.6																				
16. (i)	<table><tr><td>pattern number</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>number of rhombuses</td><td>1</td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td>number of 1-cm lines</td><td>4</td><td>10</td><td>16</td><td>22</td><td>28</td></tr></table> A: 1 A: 1			pattern number	1	2	3	4	5	number of rhombuses	1	3	5	7	9	number of 1-cm lines	4	10	16	22	28	2	
pattern number	1	2	3	4	5																		
number of rhombuses	1	3	5	7	9																		
number of 1-cm lines	4	10	16	22	28																		
(ii)	15	1	A: 1																				
(iii)	no reason: the number goes up by 6 each time 58, 64, 70 i.e. $6n - 2$ or number of lines is not a multiple of 6	2	A: 1 for 'no' if reason given A: 1 for reason																				

Q.	Answer	Mark	Additional Guidance
(iv)	pattern 25	2	M: 1 for ' $2n - 1$ ' + 99 = ' $6n - 2$ ' or ' $4n - 1$ ' = 99 A: 1 for answer
Total		100	

LEVEL 2: CALCULATOR

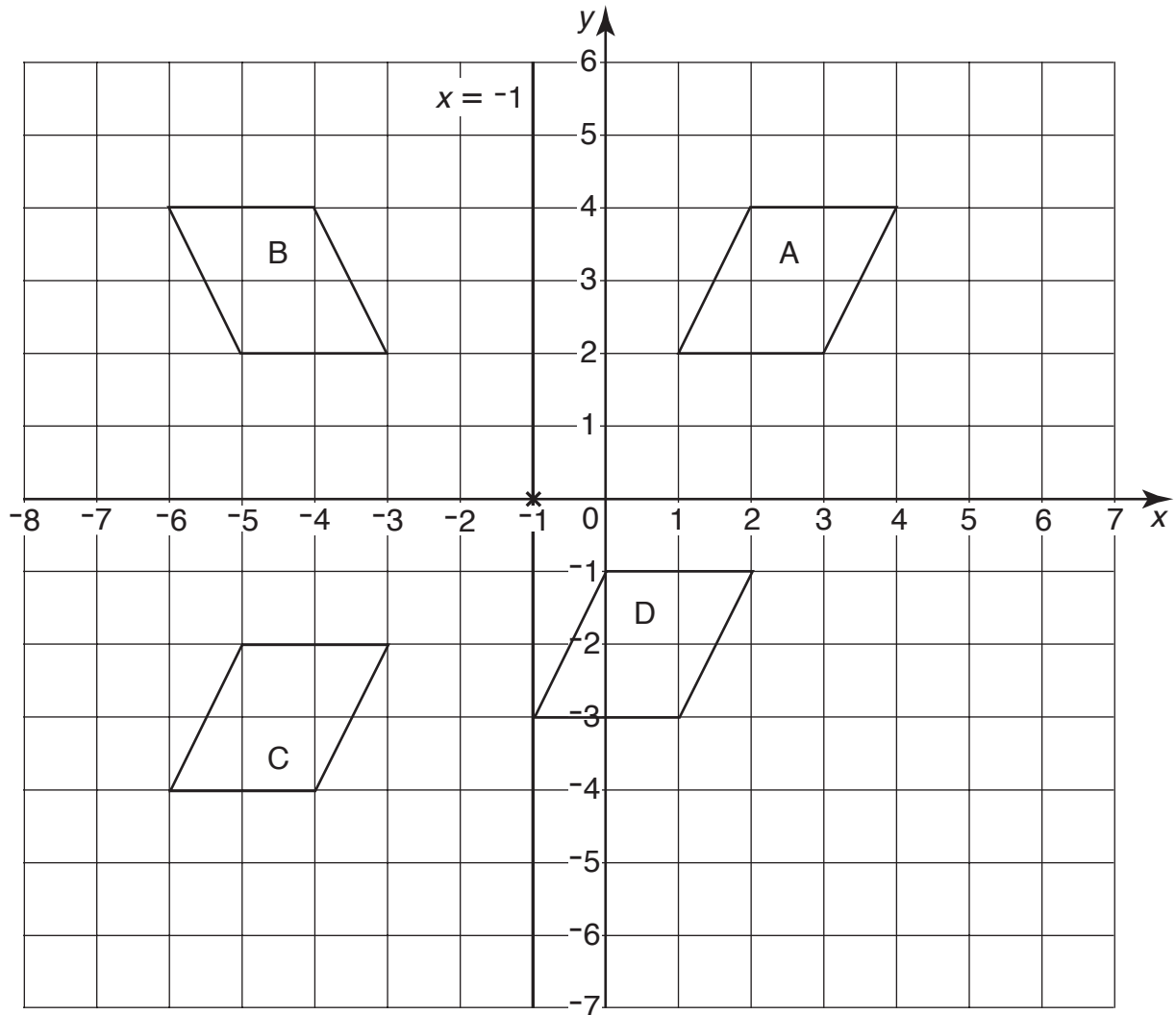
Q.	Answer	Mark	Additional Guidance
1. (a) (i)	56.76018	2	M: 1 for 125.44 A: 1 for answer
(ii)(a)	56.760	1	A: 1
(b)	57	1	A: 1
(b) (i)	$\frac{500 \times 3}{10}$	2	A: 1 for two correct A: 2 for three correct
(ii)	150	1	A: 1
(c)	$V = 36$	2	M: 1 for 27 or 4×9 A: 1 for answer
2. (a)	13 h 48 min	2	M: 1 for 2 h 35 min or 48 min A: 1 for answer
(b) (i)	2.6 h	1	A: 1
(ii)	3.85 mph	2	M: 1 for $\frac{10}{2.6}$ A: 1 for answer
(c) (i)	20 m/s	2	M: 1 for $72 \times 1000 \div 3600$ A: 1 for answer
(ii)	540 m	1	A: 1

Q.	Answer	Mark	Additional Guidance																					
3. (i) (a)	£3310	2	M: 1 for 1810 A: 1 for answer																					
(b)	45.3%	2	M: 1 for 1500 ÷ 3310 × 100 A: 1 for answer																					
(ii)	£2200	2	M: 1 for 3000 × $\frac{11}{15}$ A: 1 for answer																					
(iii)	£2100	2	M: 1 for 3 shares ≡ £1260 A: 1 for answer																					
4. (i)	58 years	1	A: 1																					
(ii)	44 years	2	M: 1 for 4th in order A: 1 for answer																					
(iii)	45 years	2	M: 1 for Σx = 315 A: 1 for answer																					
(iv) (a)	328 years	1	A: 1																					
(b)	13 years	1	A: 1																					
5. (i)	<table><tr><td></td><td>car</td><td>bus</td><td>walk</td><td>total</td></tr><tr><td>boys</td><td>7</td><td>1</td><td>3</td><td>11</td></tr><tr><td>girls</td><td>9</td><td>3</td><td>2</td><td>14</td></tr><tr><td>total</td><td>16</td><td>4</td><td>5</td><td>25</td></tr></table>			car	bus	walk	total	boys	7	1	3	11	girls	9	3	2	14	total	16	4	5	25	2	A: 2 A: 1 off for each error
	car	bus	walk	total																				
boys	7	1	3	11																				
girls	9	3	2	14																				
total	16	4	5	25																				
(ii) (a)	$\frac{14}{25}$	1	A: 1																					
(b)	$\frac{1}{5}$	1	A: 1 accept $\frac{5}{25}$																					
(iii)	$\frac{6}{7}$	2	A: 1 for 12 A: 1 for answer																					

Q.	Answer	Mark	Additional Guidance
6. (i)	$-a + 2b$	1	A: 1
(ii)	$54cd$	2	A: 1 for 54 A: 1 for cd
(iii)	$-12e^6$	2	A: 1 for -12 A: 1 for e^6
(iv)	$2f + 1$	2	A: 1 for $2f$ A: 1 for + 1
7. (a)	$18a - 11$	3	A: 1 for $18a$ A: 1 for - 15 A: 1 for answer
(b) (i)	$12(2y + 3)$	2	M: 1 for partial factorisation A: 1 for answer
(ii)	$3(2y + 3)$ <i>or equivalent</i>	1	A: 1

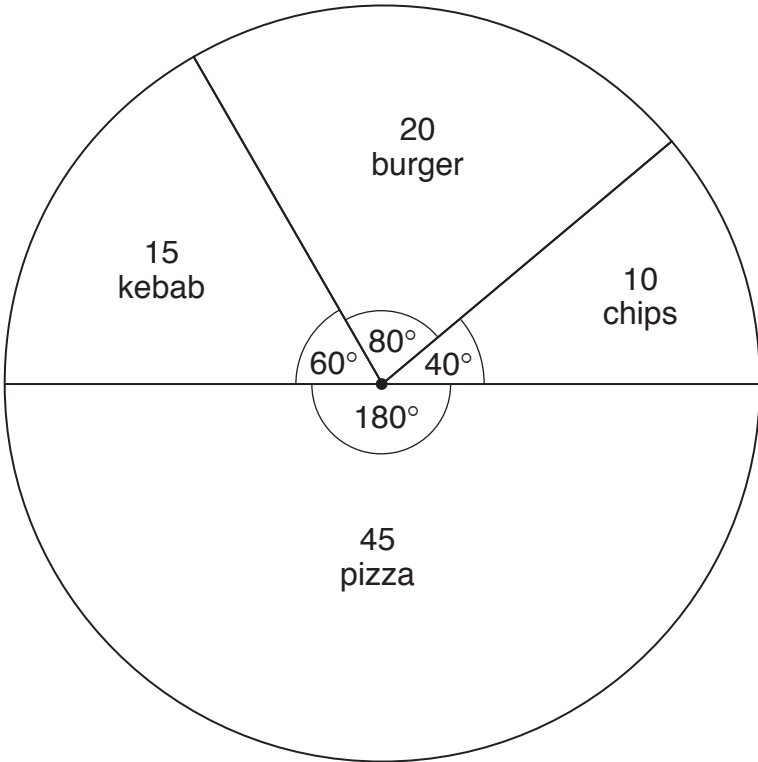
Q.	Answer	Mark	Additional Guidance
8. (i) (a)	36°	1	A: 1
(b)	10	1	A: 1
(ii)	1440°	1	A: 1
(iii)	$x = 126^\circ$	2	M: 1 for 18° A: 1 for answer

9. (i) (a)



	$x = -1$	1	A: 1
(b)	B	1	A: 1
(ii)	C	2	M: 1 for 180° rotation A: 1 for accuracy
(iii)	D	2	A: 1 for each movement
(iv)	reflection in x -axis or $y = 0$	1	A: 1

Q.	Answer	Mark	Additional Guidance
10. (i) (a)	314cm	2	M: 1 for $\pi \times 100$ or $2 \times \pi \times 50$ A: 1 for answer
(b)	7850cm ²	2	M: 1 for $\pi \times 50^2$ A: 1 for answer
(ii)	2150cm ²	2	M: 1 for 10000 A: 1 for answer
(iii)	205cm	2	M: 1 for $\frac{1}{3} \times '314'$ or 100 A: 1 for answer
11. (i)	135cm ³	2	A: 1 for 27 A: 1 for answer
(ii)	180cm ²	3	A: 1 for 9cm ² per face A: 1 for 20 faces A: 1 for answer

Q.	Answer	Mark	Additional Guidance																		
12. (i) (a)	4°	1	A: 1																		
(b)	<table><tr><th>favourite snack</th><th>number of pupils</th><th>angle</th></tr><tr><td>chips</td><td>10</td><td>40°</td></tr><tr><td>burger</td><td>20</td><td>80°</td></tr><tr><td>kebab</td><td>15</td><td>60°</td></tr><tr><td>pizza</td><td>45</td><td>180°</td></tr><tr><td>total</td><td>90</td><td>360°</td></tr></table>	favourite snack	number of pupils	angle	chips	10	40°	burger	20	80°	kebab	15	60°	pizza	45	180°	total	90	360°	2	A: 2 A: 1 off for each error
favourite snack	number of pupils	angle																			
chips	10	40°																			
burger	20	80°																			
kebab	15	60°																			
pizza	45	180°																			
total	90	360°																			
(ii)		3	A: 1 for drawing angles A: 1 for accuracy A: 1 for labels																		
(iii)	$\frac{1}{2}$	2	A: 1 for 60 pizza or 120 pupils A: 1 for answer																		

Q.	Answer	Mark	Additional Guidance
13.	23 min	3	M: 1 for 41 625 litres or 400 gallons per min A: 1 for $9250 \div 400$ or $41\,625 \div 1800$ A: 1 for answer
14. (i)	$4n$ units	1	A: 1
(ii)	$(4n + 1024)$ units	1	A: 1
(iii)	$n = 256$	2	A: 1 for $5n + 1024 = 2304$ A: 1 for answer
15. (i) (a)	sixth number is 121	2	M: 1 for $9^2 = 81$ or $49 + 32$ A: 1 for answer
(b)	8 and 16	1	A: 1
(c)	80	2	M: 1 for $\times 8$ or $\times 10$ or 361 or 441 A: 1 for answer
(ii) (a)	14	2	A: 1 for 16 A: 1 for answer
(b)	68	2	A: 1 for 40 A: 1 for answer
Total		100	

