

Stage 8: Got It?

Markscheme

Abbreviations

A: Answer mark

M: Method mark

oe: or equivalent

awrt: answer which rounds to

Unless stated otherwise a correct answer with no working gains all marks

A correct answer with alternative correct working gains all marks

A correct answer with incorrect working does not gain the relevant M mark(s)

Q		Answers	M	Notes and alternatives
1	a	Evidence of use of long multiplication to calculate '182106' 1821.06	M1 A1	Award M1A0 for attempt at using long multiplication (see National Curriculum Appendix) with one arithmetical error
	b	Evidence of short or long division to calculate '16 r 7' oe 16.5	M1 A1	Award M1A0 for attempt at using short or long division (see National Curriculum Appendix) with one arithmetical error
	c	309.567	A2	Award M1A0 for attempt at using columnar addition (see National Curriculum Appendix) with one arithmetical error
	d	-682.586	A2	Award M1A0 for attempt at using columnar subtraction (see National Curriculum Appendix) with one arithmetical error Award M1 for 682.586
	e	Evidence of '44/12 - 27/12' oe 17/12 oe	M1 A1	
	f	Evidence of '49/28 - 116/28' oe -67/28 or $-2^{11}/_{28}$ oe	M1 A1	
	g	Evidence of '23/10 \times -2/5' oe -23/25 oe	M1 A1	Penalise maximum of one mark for ('correct' positive version of answer)
	h	Evidence of '3/10 \times -13/7' oe -39/70 oe	M1 A1	
2	a	Evidence of '10' and '16' 26	M1 A1	
	b	Evidence of $(6 - 3)^2 = 9$ 8	M1 A1	

	c		Evidence of $(6 - 4)^3 = 8$ 16	M1 A1	
	d		Evidence of '72' and ' $(2^3 =) 8$ ' oe 9	M1 A1	
	e		Evidence of '49' 3.5	M1 A1	
	f		Evidence of '8' 2	M1 A1	
3	a	i	Splits into three factors; e.g. 8, 3, 5 $2^3 \times 3 \times 5$ oe	M1 A1	Penalise maximum of two marks for product not stated; e.g. 2, 7, 7
		ii	Finds 5 and 13 5×13	M1 A1	
		iii	Splits into two factors; e.g. 2, 49 2×7^2 oe	M1 A1	
		iv	Splits into at least three factors; e.g. 2, 10, 20 $2^4 \times 5^2$	M1 A1	
	b	i	Evidence of using prime factorisation of '65' and '120' 5	M1 A1	
		ii	Evidence of using prime factorisation of '65' and '120' 1560	M1 A1	
4			Evidence of ' $(24/3 =) 8$ ' Evidence of ' $69/12 \div 1/2$ ' $69/6, 23/2$ or $11\frac{1}{2}$	M1 M1 A1	
5	a		4.56×10^5	A1	
	b		2×10^6	A1	
	c		1.234×10^6	A1	
	d		1.2×10^{-1}	A1	
	e		5.6×10^{-5}	A1	
	f		6.78×10^{-8}	A1	
6			At least 12 unique solutions found systematically 24	M1 A1	
7	a	i	0.3	A1	
		ii	0.375	A1	
		iii	0.17	A1	
		iv	0.125	A1	
		v	3.5	A1	
		vi	2.25	A1	
	b	i	$625/1000$ $5/8$	M1 A1	
		ii	$45/100$ $9/20$	M1 A1	
		iii	$32/10000$ $2/625$	M1 A1	
8			No 'Jill will receive $1/5$ of the money' oe	A1 M1	Award A0M0 for 'no' with no justification

9	a		T	A1	
	b		F	A1	
	c		F	A1	
	d		T	A1	
10	a	i	165.6	A1	
		ii	165.57	A1	
		iii	200	A1	
		iv	170	A1	
	b		No '0.573 to one significant figure is 0.6' oe	A1 M1	Award A0M0 for 'no' with no justification
11	a		a^2b	A1	
	b		$8ab$	A1	
	c		$\frac{a}{2b}$	A1	
	d		$\frac{5b}{a}$	A1	
12			Evidence of '(4 × 3 =) 12'	M1	
			Evidence of '(1/2 × 10 × 3 ²)'	M1	
			57	A1	
13	a		$a(4 + b)$	A1	
	b		$2(a + 3b)$	A1	
	c		$5x(y + 3)$	A2	A1A0 for $5(xy + 3x)$ or $x(5y + 15)$
	d		$4(3p + 4)$	A2	A1A0 for $2(6p + 8)$
14	a		Collects two of the three terms correctly $6a^2b$	M1 A1	
	b		Identifies that a^2b and ab^2 are not like terms $5a^2b + 4ab^2$	M1 A1	
	c		$4a^2b$ or $10a^2$ $4a^2b + 10a^2$	M1 A1	
	d		$4a^2b$ or $4a^2 + 6b^2$ $4a^2b + 4a^2 + 6b^2$	M1 A1	
15	a		Identifies need to subtract 6 from both sides $x = y - 6$	M1 A1	
	b		Identifies need to divide both sides by 6 $x = y/6$	M1 A1	
	c		Identifies need to deal with '+1' first $x = (y - 1)/6$	M1 A1	
	d		Identifies need to deal with '÷6' first $x = 6y - 1$	M1 A1	
16	a		Line with gradient 2 Line with y-intercept 1	A1 A1	A1A0 for three or more points plotted Penalise a maximum of one mark for no labels Penalise a maximum of one mark for line segments
	b		Line with gradient -2 Line with y-intercept 4	A1 A1	
	c		Line with y-intercept 4 Line with x-intercept 4	A1 A1	

17	a	2	A1		
	b	B and C or D and E	A1		
	c	Sight of $\frac{1}{2}$ $-\frac{1}{2}$	M1 A1		
18	a	Straight line with positive gradient passing through (0,-5) oe	A1	Point (0,5) must be indicated	
	b	Straight line with positive gradient passing through (0,2) oe	A1	Point (0,2) must be indicated	
	c	Straight line with positive gradient passing through (0,-7) oe	A1	Point (0,-7) must be indicated	
	d	Straight line with negative gradient passing through (0,4) oe	A1	Point (0,4) must be indicated	
	e	Straight line with negative gradient passing through (0,3) or (3,0)	A1	Point (0,3) or (3,0) must be indicated	
	f	Parabola with a minimum at (0,0)	A1	Smooth parabola symmetrical about the y-axis	
19		Axes labelled correctly (vertical axis distance (miles), horizontal axis time)	A1	Note 'time' could also be 'time from start (minutes or hours)'	
		Straight line connecting (11:00, 0) and (11:20, 10)	A1		
		Horizontal line (11:20, 10) and (11:40, 10)	A1		
		Straight line (11:40, 10) and (12:10, 30)	A1		
		Horizontal line (12:10, 30) and (13:10, 30) Straight line (13:10, 30) to (x, 0), where x is a time after 13:10	A1		
20	a	$3x + 3 = 12$ oe $x = 3$	M1 A1		
	b	$15 = 4x + 7$ oe $x = 2$	M1 A1		
	c	$5p + 20 = 3p - 3$ oe $2p + 20 = -3$ oe $p = 8,5$	M1 M1 A1		
	d	Isolates term in a (e.g. $6 + 2a = 12$) $2a = 6$ oe $a = 3$	M1 M1 A1		
21	a	$x = 1.5$	A1		
	b	$x = 1$	A1		
	c	$-0.7 (\pm 0.1)$	A1		
22	a	5, 8, 11, 14	A1	Penalise a maximum of two marks for only three terms found	
	b	12, 7, 2, -3	A1		
	c	3, 6, 12, 24	A1		
	d	2, 6, 10, 14	A1		
	e	6, 9, 14, 21	A1		
23	a	No Justification; e.g. 'The nth term is $5n - 2$ '	A1 M1	Award A0M0 for 'no' with no justification	
	b	i	$3n \dots$ $\dots + 1$	A1 A1	
		ii	$5n \dots$ $\dots + 4$	A1 A1	

		iii	11n - 3	A1 A1	
		iv	19... ... - 4n	A1 A1	
24	a		F	A1	
	b		T	A1	
	c		T	A1	
	d		T	A1	
25			Uses scaling to calculate comparable quantities; e.g. 4 litres / £10 and 4 litres / £11 Conclusion; e.g. 'in the small bottle 1 litre is equivalent to £2.75. In the large bottle 1 litre is equivalent to £2.50'	M1 A1	
26			4.5 ÷ 50000 0.00009 km 9cm	M1 M1 A1	
27	a		15 × 1.4 oe 21	M1 A1	
	b		28 ÷ 1.4 oe 20	M1 A1	
	c		1 ÷ 1.4 oe 0.71(428...)	M1 A1	
28	a		5/6	A1	
	b		1/6	A1	
29	a		2/3 oe 10/3 oe 13(.33...) cm	A1 A1 A1	
	b		Finds any relevant multiplier Finds a multiplier that can be used to make a comparison	M1 A1	
30			Yes Justification; e.g. 'The ratio 2:1 involves three parts; one person receives 2/3 and the other 1/3'	A1 A1	Award A0M0 for 'Yes' with no justification
31	a		40:300 oe 2:15	M1 A1	
	b		400:80000 oe 1:200	M1 A1	
	c		100:1000 oe 1:10	M1 A1	
32	a		60 × 2.2 <u>or</u> 80 × 1.2 + 80 (£)132	M1 A1	
	b		25 ÷ 20 125%	M1 A1	
33	a		84 ÷ 0.7 (£)120	M1 A1	Alt: M1 for (£)84 is 70% so 10% is (£)12

	b	Evidence of '5% → £12.50' Evidence of '12.5 × 4' oe £300	M1 M1 A1	
34	a	132 'Corresponding angles are equal' oe	A1 A1	
	b	105 'Corresponding angles are equal and the sum of angles on a straight line is 180°'	A1 A1	
	c	72 'Corresponding angles are equal and the sum of angles on a straight line is 180°'	A1 A1	
35	a	'Angles labelled a, b and c' oe 'Alternate angles (a and c) identified' oe 'a + b + c = 180°'	M1 M1 A1	
	b	'Hexagon split into 4 triangles' oe 4 × 180° oe	M1 A1	
36		Shape with vertices: (9,0), (6,3), (6,6), (9,6)	A3	A2 for three vertices A1 for two vertices
37		No <i>Justification; e.g. 'She has drawn the front elevation'</i>	A1 A1	Award A0M0 for 'no' with no justification
38	a	Straight line segment connecting any two points on the circumference	A1	
	b	Straight line segment connecting the centre to one point on the circumference	A1	
	c	The perimeter of the circle	A1	
	d	Middle of the circle	A1	
	e	Straight line segment connecting two points on the circumference and passing through the centre	A1	
39	a	5 cm line due east from start Line of 6cm drawn on a bearing of 058 - 062°	A1 A1	
	b	'3.2cm (± 0.2) ' oe 32 (± 0.2)	M1 A1	
	c	057 (± 3)	A1	
40	a	Indicates 'Both Tony and Terri are correct'	A1	
	b	No <u>and</u> justification; e.g. ' <i>Square the radius and then multiply by pi</i> '	A1	Award A0M0 for 'No' with no justification
41	a	$\pi \times 8$ 25.1...	M1 A1	Allow answers in terms of π Penalise a maximum of one mark for incorrect rounding
	b	$\pi \times 16$ 50.2...	M1 A1	
	c	$10 \times \pi \div 2 (= 15.707...)$ 15.707... + 10 awrt 25.7	M1 M1 A1	
	d	$16 \times \pi \div 4 (= 12.566...)$ 12.566... + 8 + 8 awrt 28.6	M1 M1 A1	

42	a	$\pi \times 7^2$ awrt 153.9	M1 A1									
	b	10.5 identified $\pi \times 10.5^2$ awrt 346.4	M1 M1 A1									
	c	$\pi \times 7.5^2$ ' $\pi \times 7.5^2$ ' $\div 2$ 15×7 (= 105) awrt 193.4	M1 M1 M1 A1									
	d	$\pi \times 3^2$ ' $\pi \times 3^2$ ' $\div 4$ awrt 7.1	M1 M1 A1									
43	a	$6 \times 8 \div 2$ (= 24) '24' $\times 12$ 288	M1 M1 A1									
	b	$\pi \times 5^2$ (= 78.539...) '78.539...' $\times 10$ awrt 785.4	M1 M1 A1									
44		'A population includes every member of a set of data' oe 'A sample is part of a population' oe	A1 A1									
45		Line connecting scatter 1 to box 3 Line connecting scatter 2 to box 1 Line connecting scatter 3 to box 2	A2	Award A1 for one correct connection								
46	a	Negative	A1									
	b	No	A1									
	c	Positive	A1									
47		Horizontal axis labelled extra time and vertical axis labelled frequency All rectangular bars drawn with correct boundaries (no gaps between bars) All bars correct height	A1 A1 A1									
48	a	Midpoints used: 2, 5, 9, 14 'fx' column completed: 8, 25, 27, 14 Evidence of ' $4 + 5 + 3 + 1 = 13$ ' oe Evidence of ' $74 \div 13$ ' oe awrt 5.7	M1 M1 M1 M1 A1									
	b	$4 \leq x < 6$	A1									
	c	16	A1									
	d	Correct comment; e.g. 'Unreliable as the data is grouped'	A1									
49		<table style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td></td> <td>28</td> </tr> <tr> <td>35</td> <td>7</td> </tr> <tr> <td>60</td> <td>7</td> </tr> <tr> <td>25</td> <td>18</td> </tr> </tbody> </table>		28	35	7	60	7	25	18	A2	A1 for 60, 35, 25 A1 for 28 and 7
	28											
35	7											
60	7											
25	18											

50		Yes Justification; e.g. '100 ÷ 6. Each number should occur about 17 times'	A1 M1	Award A0M0 for 'yes' with no justification
51	a	Any event with a theoretical probability of 1/6 (e.g. getting a '1' on a regular fair die')	A1	
	b	Any event with a theoretical probability of 1/3 (e.g. getting number greater than 4 on a regular fair die')	A1	
	c	Any event with a theoretical probability of 1/2 (e.g. getting a 'head' when flipping a coin)	A1	
52	a	$\frac{8}{22}$ oe	A1 A1	A1 for 8 (or 4) A1 for 22 (or 11)
	b	$\frac{1}{22}$ oe	A1	
53		1 – 0.4 – 0.25 0.35	M1 A1	
54	a	Two intersecting circles and universal set. Labels: Badminton and Table Tennis 16 in region outside rings 10 and 8 in regions for only badminton and table tennis respectively Intersection labelled 6	A1 A1 A1 A1	
	b	$\frac{6}{40}$ oe	A1	
	c	$\frac{6}{10}$ oe	A2	A1 for 6 (or 3) A1 for 10 (or 5)
55		Yes Justification; e.g. 'Probability = 1/6 × 1/6' oe	A1 A1	Award A0M0 for 'yes' with no justification
Total marks			286	