GCSE Mathematics (9–1) Practice Tests Set 9 – Paper 1H mark scheme

Q	Working	Answer	Mark	Notes
1	20 × 14 (= 280)	460	4	M1
	$\frac{20+16}{2} \times (24-14)$ (= 180)			M1
	"280" + "180"			M1 (dep) on at least one of the previous M marks
				A1
				Total 4 marks
	Alternative scheme 1			
	(24 +14)÷2 (= 19) **and** (20−16)÷2 (=2)	460	4	M1
	2 × 19 (= 38) **and** 16 × 24 (= 384)			M1
	"38" + "38" + "384"			M1 (dep) on at least one of the previous M marks
				A1
				Total 4 marks
	Alternative scheme 2			
	20 × 24 (= 480)	460	4	M1
	(20−16)÷2 (=2) **and** 24 − 14 (= 10) 2 × 10 = 20			M1
	"480" – "20"			M1 (dep) on at least one of the previous M marks
				A1
				Total 4 marks

Q	Working	Answer	Mark	Notes
2 (a)		Correct **R** (5,6), (3,6), (3,5)	2	B2 fully correct If not B2 then B1 for correct orientation of **R** but in wrong position
(b)		Correct **T** (2,−1), (2,−3), (1,−3)	1	B1
				Total 3 marks

Q	Working	Answer	Mark	Notes
3	For example, *n* | *E* 1 | 7 2 | 11 3 | 17 4 | 25 5 | 35	No + reason	2	M1 for evaluating *E* correctly for any value of *n*
				A1 for No with *E* evaluated correctly as a non-prime number
				Total 2 marks

Q	Working	Answer	Mark	Notes
4	Angle $EBG = 180 - 2 \times 65$ (= 50) or Angle $ABE = 180 - (38 + 65)$ (= 77)	27	3	M1
	Angle $ABE = 180 - (38 + 65)$ (= 77) **and** Angle ABG = "77" – "50"			M1 for a complete method to find angle ABG
				A1
				Total 3 marks
	Alternative scheme 1			
	Angle $EBG = 180 - 2 \times 65$ (= 50) or Angle EBC = 103	27	3	M1
	Angle EBC = 103 **and** Angle ABG = 180 – (103 + "50")			M1 for a complete method to find angle ABG
				A1
				Total 3 marks

Q	Working	Answer	Mark	Notes
5 (a)		$4n + 2$	2	M1 for $4n + k$ (k may be 0 or absent) oe
				A1 oe e.g $6 + (n - 1)4$
(b)		$4n + 6$	1	B1 oe ft part (a) providing M1 in part (a) is awarded e.g $4(n + 1) + 2$
				Total 3 marks

Question	Working	Answer	Mark	Notes
6 (a)		$5y^4$	2	B2 B1 for fully simplifying terms in x or terms in y
(b)	$h - f = 3e$ or $\frac{h}{3} = e + \frac{f}{3}$ or $\frac{h-f}{3}$	$e = \frac{h-f}{3}$	2	M1
				A1 oe, accept $e = \frac{f-h}{-3}$
				Total 4 marks

Q	Working	Answer	Mark	Notes
7 (a)		1.39×10^6	1	B1
(b)		5×10^{-3}	1	B1
				Total 2 marks

Question	Working	Answer	Mark	Notes
8	$16x = 32$ or $32y = 144$	(2, 4.5)	3	M1 for a correct sequence of operations which leads to 1 equation in one unknown, allowing one arithmetical error
	$3 \times$ '2' + $2y = 15$ or $3x + 2 \times$ '4.5' = 15			M1 (dep) substitute found value of one variable in one equation
				A1
				Total 3 marks

Question	Working	Answer	Mark	Notes
9	eg (*COA*=) 360 – (2 × 90 + 74) (=106) or (*COA*=) 180 – 74 (=106) or *OAB* = 90 or *OCB* = 90	53	3	M1 Fully correct method to find *COA* or *OAB* or *OCB*
	"106" ÷ 2			M1
				A1 values may be seen on diagram throughout
				Total 3 marks

Q	Working	Answer	Mark	Notes
10	$\frac{1}{3}+\frac{1}{5}$ (= $\frac{8}{15}$) or 0.53... or 53.3.....% or 53%	900	4	M1
	1− $\frac{8}{15}$ (= $\frac{7}{15}$) or 0.46..... or 0.47 or 46.6...% or 47%			M1
	420 ÷ $\frac{7}{15}$ (= 900) oe			M1
				A1
				Total 4 marks

Question	Working	Answer	Mark	Notes
11	$2^7 = 4^{2x} \times 2^x$ or $128 = (2^2)^{2x} \times 2^x$	1.4	3	M1 Replacing 128 by 2^7 or 4 by 2^2
	$7 = 2(2x) + x$			M1
				A1 oe
				Total 3 marks

Q		Working	Answer	Mark	Notes	
12	(a)		$8e^6f^9$	2	B2 B1	 for 2 correct terms in a product of 3 terms
	(b)	$3x^2 + 9xy - 4yx - 12y^2$	$3x^2 + 5xy - 12y^2$	2	M1	M1 for 3 correct terms out of 4 **or** for 4 correct terms ignoring signs **or** for $3x^2 + 5xy + c$ for any non zero value of c **or** for $d +$ $5xy - 12y^2$ for any non zero value of d
					A1	
	(c)	$a^{\frac{1}{2}} \times a = a^{\frac{3}{2}}$ or $\frac{a}{a^{-2}} = a^3$ or $\frac{a^{\frac{1}{2}}}{a^{-2}} = a^{\frac{5}{2}}$	$\frac{7}{2}$	2	M1	for one correct step
					A1	oe
	(d)	$\frac{2^n - 1}{(2^n - 1)(2^n + 1)}$	$\frac{1}{2^n + 1}$	2	M1	for $(2^n - 1)(2^n + 1)$
					A1	
						Total 8 marks

Q	Working	Answer	Mark	Notes
13 (a)		$\frac{9}{20}$ on first red branch	3	B1
		Correct binary structure		B1
	$\frac{9}{20}, \frac{7}{16}, \frac{9}{20}, \frac{7}{16}$	Labels and correct probabilities on all second branches		B1
(b)	$\frac{'9'}{20} \times \frac{'7'}{16}$	$\frac{63}{320}$ or 0.196(875)	2	M1
				A1 oe ft diagram Accept 0.20 or better
(c)	$\frac{'9'}{20} \times \frac{'7'}{16} + \frac{11}{20} \times \frac{9}{16}$	$\frac{162}{320}$ or 0.506(25)	3	M1 for $\frac{11}{20} \times \frac{9}{16}$
				M1 for $\frac{'9'}{20} \times \frac{'7'}{16} + \frac{11}{20} \times \frac{9}{16}$
				A1 oe Accept 0.51 or better
				Total 8 marks

Q	Working	Answer	Mark	Notes
14	FDs are 2, 3, 2.8, 0.7, 0.8	Correct histogram	3	M1 for any two correct FD calculations (can be implied by at least two correct bars)
				M1 for any three correct FDs (can be implied by at least three correct bars)
				A1 fully correct histogram
				(SC: B2 for all five bars of correct width with heights in the correct ratio)
				(SC:B1 for three bars of correct width with heights in the correct ratio)
				Total 3 marks

Question	Working	Answer	Mark	Notes
15 (a)	eg $x = 0.4\dot{3}\dot{6}$ and $100x = 43.6\dot{3}\dot{6}$ or $10x = 4.\dot{3}\dot{6}$ and $1000x = 436.\dot{3}\dot{6}$		2	M1 eg two decimals that when subtracted give a finite decimal
	$99x = 43.2$, $x = \frac{43.2}{99}$ or $990x = 432$, $x = \frac{432}{990}$	show		A1 for completing the 'show that' arriving at given answer from correct working.
(b)			3	M1 for $\sqrt{20} = 2\sqrt{5}$ and $\sqrt{80} = 4\sqrt{5}$ **or** $\frac{\sqrt{20}+\sqrt{80}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$ or $\frac{\sqrt{20}+2\sqrt{20}}{\sqrt{3}}$
				M1dep for $\frac{6\sqrt{15}}{3}$ or $2\sqrt{15}$ or $\frac{3\sqrt{60}}{3}$ oe
		$\sqrt{60}$		A1 dep on M2, accept $a = 60$
				Total 5 marks

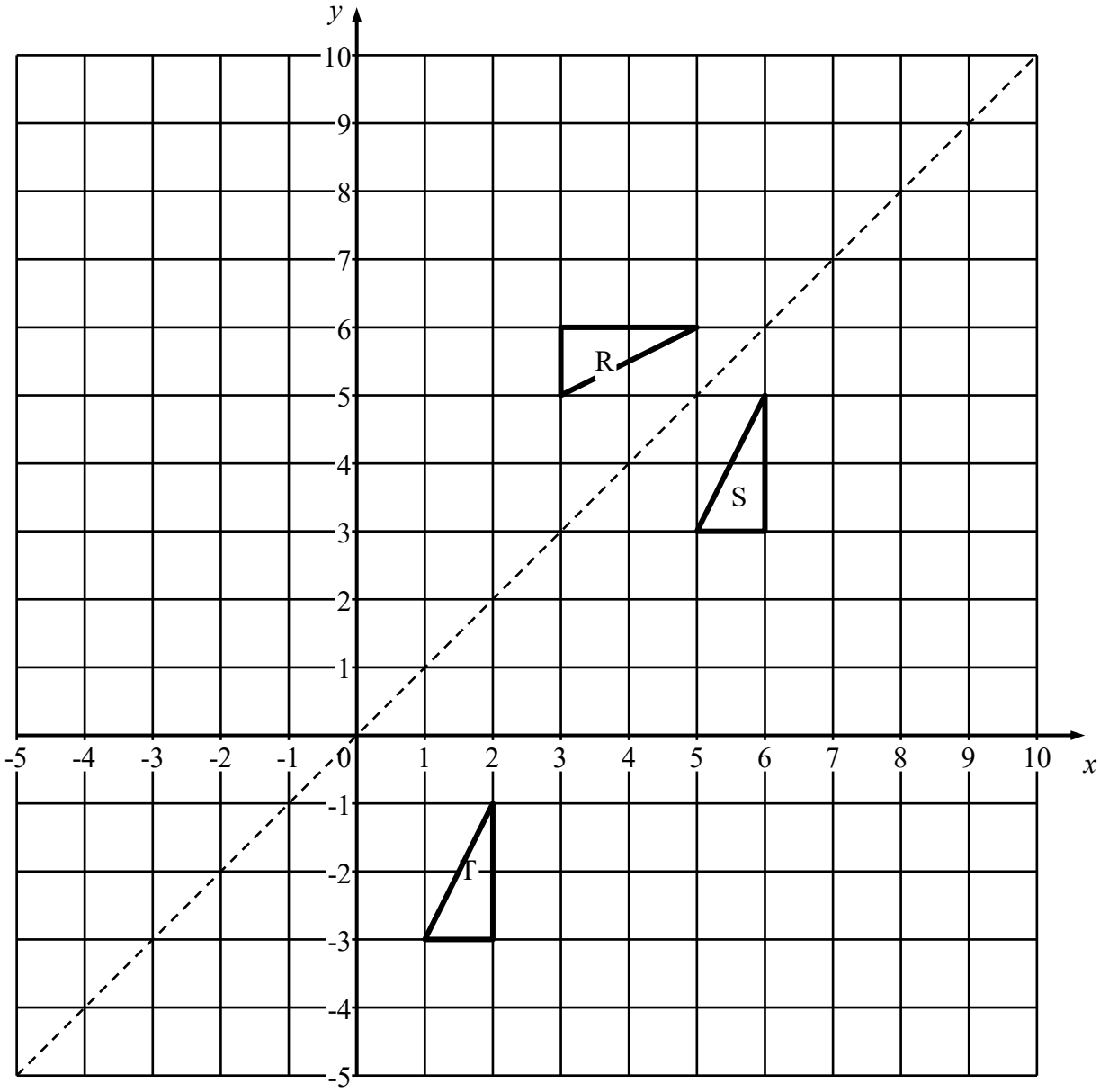
Q	Working	Answer	Mark	Notes
16	$h = f\left(\frac{x+1}{2}\right) = 1 + \frac{1}{\frac{x+1}{2}} \left(= 1 + \frac{2}{x+1}\right)$	$\frac{2}{x-1} - 1$ or $\frac{3-x}{x-1}$	4	M1 for $1 + \frac{1}{\frac{x+1}{2}}$
	$\left(y = 1 + \frac{2}{x+1}\right)$ $y - 1 = \frac{2}{x+1}$ or $y(x+1) = 1(x+1) + 2$			M1 (dep on M1) for a correct first step to change the subject
	$x + 1 = \frac{2}{y-1}$ or $xy - x = 3 - y$			M1 (dep on M1)
	$x = \frac{2}{y-1} - 1$ or $x = \frac{3-y}{y-1}$			A1 oe
				Total 4 marks
	Alternative scheme			
	$h = f\left(\frac{x+1}{2}\right) = 1 + \frac{1}{\frac{x+1}{2}} \left(= 1 + \frac{2}{x+1} = \frac{x+3}{x+1}\right)$	$\frac{3-x}{x-1}$	4	M1 for $1 + \frac{1}{\frac{x+1}{2}}$
	$\left(y = \frac{x+3}{x+1}\right)$ $y(x+1) = (x+3)$			M1 (dep on M1) for a correct first step to change the subject
	$xy - x = 3 - y$			M1 (dep on M1)
	$x = \frac{3-y}{y-1}$			A1 oe
				Total 4 marks
Note: Allow candidates to swap *x* and *y* when finding the inverse				

Question	Working	Answer	Mark	Notes
17 (a)		(−2, −2), (1, 6), (4, −2) Plotted and joined	2	B2 Fully correct graph- professional judgment required. (B1 for (1, 6) plotted **OR** (−2, −2) and (4, −2) plotted)
(b)		(2, −1), (−1, 3) (−4, −1) Plotted and joined	2	B2 Fully correct graph – professional judgment required. (B1 for 2 of the 3 points plotted) SC B1 for a correct reflection in the *x*-axis
				Total 4 marks

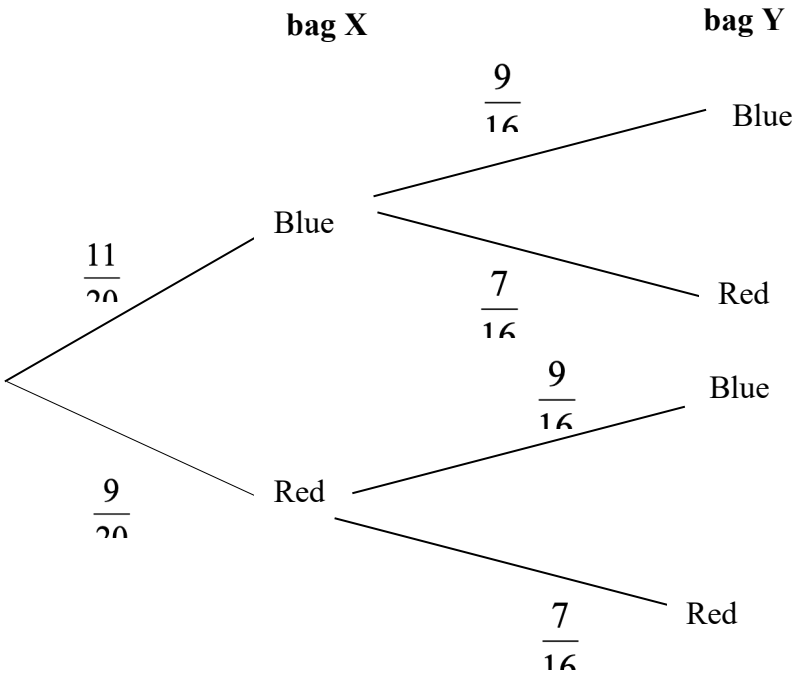
Q	Working	Answer	Mark	Notes
18 (a)	$x(x^2-1)$ or $(x^2-x)(x+1)$	x^3-x	1	B1 for correct expansion of a pair of brackets and then x^3-x written down
(b)	(One of the numbers) is even **or** multiple of 2 **or** 2 is a factor	Proof	3	M1
	(One of the numbers) is a multiple of 3 **or** 3 is a factor			M1
	Hence a multiple of 6			A1
				Total 4 marks

Q	Working	Answer	Mark	Notes
19	(First term = 3 and last term = 999) or $a = 3$ and $d = 3$	166 833	4	M1
	$999 \div 3$ (= 333)			M1 for finding the number of terms Allow $1000 \div 3 = 333.3 = 333$
	Sum = $\frac{333}{2}(3 + 999)$ or Sum = $\frac{333}{2}(2 \times 3 + (333 - 1)3)$			M1 for using a correct method to find the sum
				A1
				Total 4 marks

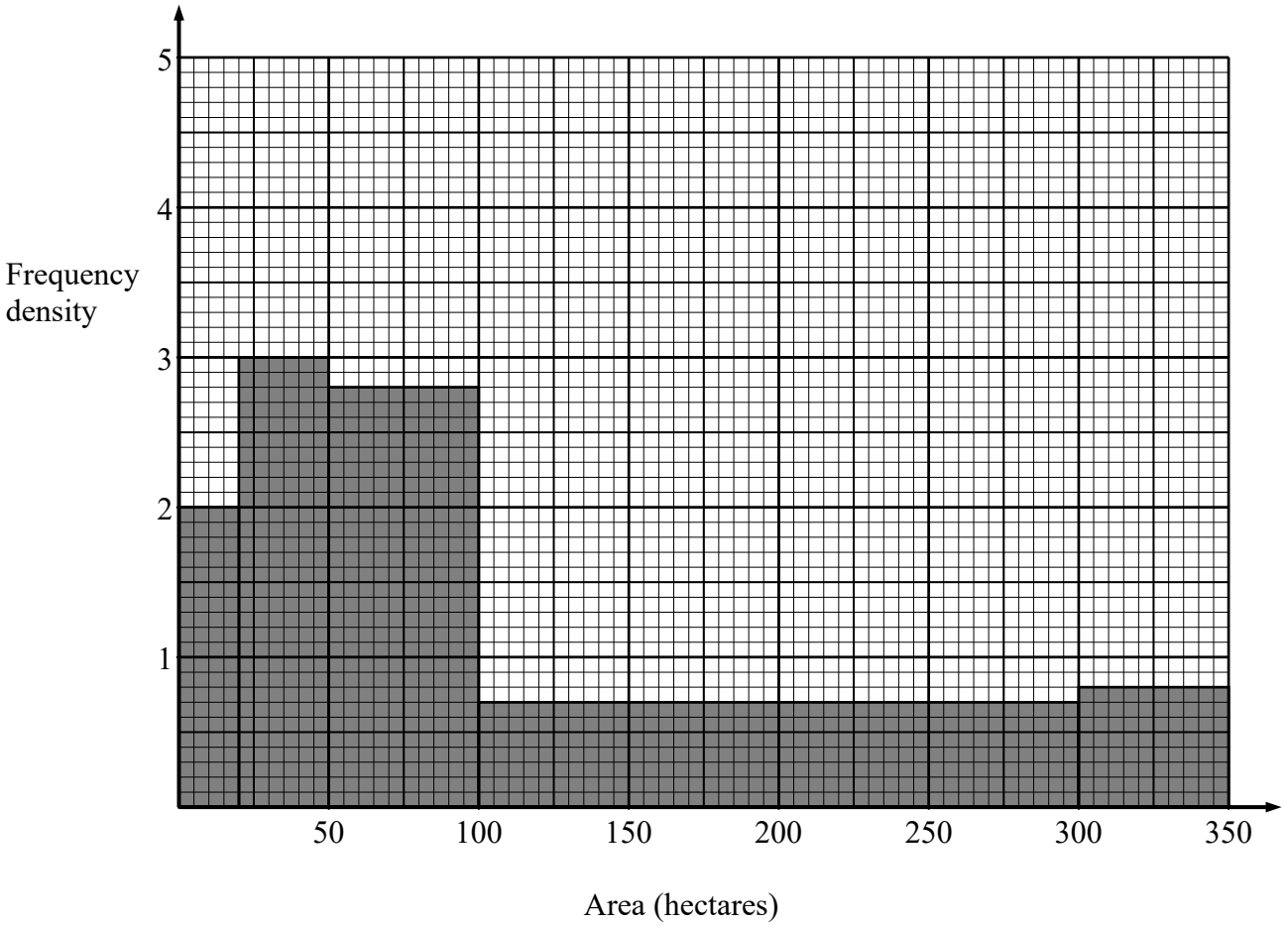
2



13



15


Frequency density
5
4
3
2
1
50
100
150
200
250
300
350
Area (hectares)

					Mean score of students achieving grade:							
Question	**Skill tested**	**Mean score**	**Max score**	**Mean %**	**ALL**	9	8	7	6	5	4	3
Q01	Mensuration of 2D shapes	3.38	4	85	3.38	3.88	3.78	3.66	3.21	2.43	1.80	0.80
Q02a	Transformation geometry	1.37	2	69	1.37	1.92	1.69	1.41	0.93	0.69	0.25	0.16
Q02b	Transformation geometry	0.83	1	83	0.83	0.94	0.87	0.81	0.81	0.69	0.59	0.56
Q03	Expressions and formulae	1.06	2	53	1.06	1.39	1.21	1.01	0.92	0.70	0.27	0.40
Q04	Geometrical reasoning	2.33	3	78	2.33	2.90	2.59	2.31	1.98	1.65	1.38	0.80
Q05a	Sequences	1.66	2	83	1.66	1.97	1.82	1.69	1.49	1.30	1.00	0.72
Q05b	Sequences	0.42	1	42	0.42	0.81	0.51	0.27	0.16	0.09	0.05	0.08
Q06a	Algebraic manipulation	1.72	2	86	1.72	1.98	1.90	1.72	1.58	1.25	1.27	1.04
Q06b	Expressions and formulae	1.78	2	89	1.78	1.98	1.95	1.91	1.72	1.48	0.84	0.75
Q07a	Standard form	0.92	1	92	0.92	0.99	0.99	0.96	0.91	0.84	0.62	0.36
Q07b	Standard form	0.90	1	90	0.90	0.99	0.96	0.92	0.84	0.82	0.62	0.40
Q08a		1.59	2	80	1.59	-	-	1.84	-	-	0.92	-
Q08b		2.74	4	69	2.74	-	-	3.31	-	-	0.79	-
Q09	Circle properties	2.14	3	71	2.14	2.91	2.70	2.14	1.59	0.88	0.45	0.29
Q10	Simultaneous linear equations	2.59	3	86	2.59	2.97	2.88	2.73	2.39	1.99	1.56	0.76
Q11	Fractions	2.97	4	74	2.97	3.89	3.57	3.26	2.33	1.51	0.70	0.32
Q12	Powers and roots	1.56	3	52	1.56	2.84	1.99	0.92	0.70	0.49	0.31	0.62
Q13a	Probability	2.32	3	77	2.32	2.77	2.47	2.29	2.11	1.80	1.75	1.20
Q13b	Probability	1.66	2	83	1.66	1.99	1.92	1.85	1.50	0.98	0.64	0.24
Q13c	Probability	2.35	3	78	2.35	2.95	2.82	2.64	1.97	1.14	0.80	0.12
Q14a	Powers and roots	1.51	2	76	1.51	1.94	1.80	1.45	1.13	1.00	0.72	0.64
Q14b	Algebraic manipulation	1.65	2	83	1.65	1.91	1.76	1.68	1.61	1.30	1.03	0.60
Q14c	Powers and roots	0.82	2	41	0.82	1.80	1.06	0.40	0.15	0.07	0.03	0.00
Q14d	Expressions and formulae	0.29	2	14	0.29	0.85	0.18	0.05	0.04	0.01	0.00	0.00
Q15	Graphical representation of data	2.12	3	71	2.12	2.89	2.65	2.22	1.45	0.99	0.52	0.12
Q16a	Decimals	1.09	2	55	1.09	1.75	1.38	0.97	0.64	0.24	0.15	0.00
Q16b	Powers and roots	1.63	3	54	1.63	2.73	2.14	1.31	0.80	0.35	0.27	0.21
Q17	Function notation	1.32	4	33	1.32	3.08	1.39	0.64	0.31	0.10	0.05	0.00
Q18a	Transformation geometry	0.88	2	44	0.88	1.64	1.14	0.54	0.33	0.29	0.08	0.17
Q18b	Transformation geometry	0.85	2	43	0.85	1.67	1.07	0.52	0.25	0.18	0.18	0.08
Q19a	Algebraic manipulation	0.78	1	78	0.78	0.98	0.94	0.87	0.65	0.45	0.17	0.08
Q19b	Algebraic manipulation	0.13	3	4	0.13	0.43	0.03	0.02	0.00	0.01	0.00	0.00
Q20	Sequences	1.30	4	33	1.30	2.88	1.37	0.78	0.32	0.15	0.14	0.08
		50.66	**80**	**63**	**50.66**	**64.62**	**53.53**	**49.10**	**34.82**	**25.87**	**19.95**	**11.60**

Suggested Grade Boundaries based on peformance of students in Summer 2018

9	8	7	6	5	4	3
59	51	42	31	23	16	12