GCSE Mathematics (9–1) Practice Tests Set 9 – Paper 2H mark scheme

Question	Working	Answer	Mark	Notes
1	eg $\frac{x+10+y}{3}=11$ oe **or** $y-x=7$ oe 3 × 11 (=33)		2	M1 for one correct equation in x and y **OR** finding the total of x, 10 and y **OR** two numbers with a sum of 23 **OR** two numbers with a range of 7 Note: condone non-integers for the award of M1
		$x = 8,\ y = 15$		A1
				Total 2 marks

Question	Working	Answer	Mark	Notes
2	(area =) 2 × 1.25 (=2.5)		3	M1
	(*F* =) 42 × "2.5" or 42 = $\frac{F}{"2.5"}$			M1 Correct substitution into pressure formula
		105		A1 cao
				Total 3 marks

Question	Working	Answer	Mark	Notes
3	$1 \times 5 + 3 \times 9 + 5 \times 24 + 7 \times 40 + 9 \times 7$ (= 495) **or** 5 + 27 + 120 + 280 + 63 (= 495)	5.8	4	M2 for at least 4 correct products added (need not be evaluated) If not M2 then award M1 for consistent use of value within interval (including end points) for at least 4 products which must be added **OR** correct mid-points **used** for at least 4 products and not added
	"495" ÷ 85			M1 dep on at least M1 Allow division by their $\sum f$ provided addition or total under column seen
				A1 for 5.8 − 5.824
				Total 4 marks

Question	Working	Answer	Mark	Notes
4	eg (6.3 × 1000) ÷ 210 (= 30)		4	M1 for a method to find the number of candles, could work in grams or kg
	$\frac{2}{5} \times "30" \times 13\ (=156)$			M1 for a method to find money made from the $13 candles
	$\left(1-\frac{2}{5}\right) \times "30" \times 0.8 \times 13\ (=187.20)$			M1 for a method to find money made from the reduced candles
		343.2(0)		A1
				Total 4 marks

Question	Working	Answer	Mark	Notes	
5	675 ÷ (5 + 4) × 5 (= 375)	225	3	M1	M2 675 ÷ (5 + 4) × 3
	"375" ÷ 5 × 3			M1 dep M1	
				A1	
					Total 3 marks

Question	Working	Answer	Mark	Notes
6 (a)	$3c - 21 + 6c + 8$	$9c - 13$	2	M1 For 3 or 4 terms correct A1
(b)	$x^2 - 2x + 7x - 14$	$x^2 + 5x - 14$	2	M1 For 3 correct terms or for 4 correct terms ignoring signs or for $x^2 + 5x + k$ for any non-zero value of k or for .... + $5x - 14$ A1
(c)		$7y(4y - 3)$	2	B2 B1 for $y(28y - 21)$ or $7(4y^2 - 3y)$ or $7y(4y + k)$ or $7y(ay - 3)$
(d)	eg $7x - 2 = 4(3x + 1)$ oe	$-\frac{6}{5}$	3	M1 correct first step
	$7x - 12x = 4 + 2$ oe or $-2 - 4 = 12x - 7x$ oe			M1 for rearranging the x terms on one side and the numerical terms on the other. ft rearranging their expansion $ax + b = cx + d$ eg $7x - 2 = 12x + 4$
				A1 oe, dep on M1
				Total 9 marks

Question	Working	Answer	Mark	Notes
7	eg $7x - 2 = 4(3x + 1)$ oe		3	M1 correct first step
	$7x - 12x = 4 + 2$ oe or $-2 - 4 = 12x - 7x$ oe			M1 for rearranging the x terms on one side and the numerical terms on the other. ft rearranging their expansion $ax + b = cx + d$ eg $7x - 2 = 12x + 4$
		$-\frac{6}{5}$		A1 oe, dep on M1
				Total 9 marks

Question	Working	Answer	Mark	Notes
8	6h 42 min = 6.7 h or $6\frac{42}{60}$ oe or 402 (mins) or 24120 (secs) **OR** 10.8(33…)(km)		3	B1 for converting 6h 42min into hours or minutes or seconds **OR** finding distance travelled in 1 minute
	eg 6.7 × 650 or (402 × 650) ÷ 60 or (24120 × 650) ÷ 3600 or 6 × 650 + 42 × 10.8			M1 use of s × t, allow 6.42 × 650 (=4173)
		4355		A1
				Total 3 marks

Question	Working	Answer	Mark	Notes
9	Eg $\frac{1.5}{100} \times 20\,000$ oe or 300 OR $20\,000 \times 1.015^3$ $\frac{1.5}{100}$ × (20 000+'300')= 304.5 $\frac{1.5}{100}$ × (20 000+'300'+'304.5') = 20913.5675	20 914	3	M1 for eg $\frac{1.5}{100} \times 20\,000$ oe or 300 M1 for completing method OR M2 for $20\,000 \times 1.015^3$ or $20\,000 \times 1.015^4$ or 21 227.27.. (M1 for $20\,000 \times 1.015^2$ or 20 604.5) Accept 1 + 0.015 as equivalent to 1.015 throughout **SC**: If no other marks gained, award M1 for 20 000 × 1.045 oe or 20900 or 900 A1 Answers in range 20 913– 20 914
				Total 3 marks

Question	Working	Answer		Mark	Notes
10	$160^2 + 200^2$ (=65600)		3	M1	
	$\sqrt{160^2 + 200^2}$			M1	
		256		A1	accept 256 – 256.2
					Total 3 marks

Question	Working	Answer	Mark	Notes
11	2.5 − 0.6 = 1.9	2 hours 51 minutes	4	M1
	3 × 12 × "1.9" (= 68.4)			M1 for using length × width × height to find a volume
	"68.4" × 1000 ÷ 400 (= 171 minutes)			M1 for their volume × 1000 ÷ 400
				A1
				Total 4 marks
	Alternative scheme			
	250 − 60 = 190	2 hours 51 minutes	4	M1
	300 × 1200 × "190" (= 6.84×10^7)			M1 for using length × width × height to find a volume
	"6.84×10^7" ÷ 10^6 × 1000 ÷ 400 (= 171 minutes)			M1 for their volume ÷ 10^6 × 1000 ÷ 400
				A1
				Total 4 marks

Question	Working	Answer		Mark	Notes
12	Interior angle of pentagon (180 × 3) ÷ 5 (= 108) oe		4	M1	or exterior angle of pentagon = $\frac{360}{5}$ (= 72)
	Interior angle of octagon (180 × 6) ÷ 8 (= 135) oe			M1	or exterior angle of octagon = $\frac{360}{8}$ (= 45)
	(*CBF* =) 360 – ("108" + "135") (= 117)			M1	(*CBF* =) "72" + "45" (= 117)
		31.5		A1	
					Total 4 marks

Question	Working	Answer	Mark	Notes
13	24.3 – 16 (= 8.3)		4	M1 Forming a right angled triangle with 24.3 – 16 on one side, 8.3 may be seen on diagram
	$\tan y = \frac{12.5}{8.3}$ or $\tan z = \frac{8.3}{12.5}$ **OR** $\sqrt{8.3^2 + 12.5^2}$ (= 15.004…) **and** $\sin y = \frac{12.5}{15.0}$ or $\sin z = \frac{8.3}{15.0}$ or $\cos y = \frac{8.3}{15.0}$ or $\cos z = \frac{12.5}{15.0}$			M1 for a correct trig statement involving angle *CDE* or *DCE* where *E* is on the line *AD* and *CE* is perpendicular to *AD*
	$\tan^{-1}\left(\frac{12.5}{8.3}\right)(= 56.415\ldots)$ or $\tan^{-1}\left(\frac{8.3}{12.5}\right)(= 33.584\ldots)$ or $\sin^{-1}\left(\frac{12.5}{15.0}\right)(= 56.415\ldots)$ or $\sin^{-1}\left(\frac{8.3}{15.0}\right)(= 33.584\ldots)$ or $\cos^{-1}\left(\frac{8.3}{15.0}\right)(= 56.415\ldots)$ or $\cos^{-1}\left(\frac{12.5}{15.0}\right)(= 33.584\ldots)$			M1 complete method to find angle *CDE* or *DCE*
		123.6		A1 123.5 – 123.6
				Total 4 marks

Question	Working	Answer	Mark	Notes
14	72 × 1000 (= 72000) or 72 ÷ 60 (= 1.2) or 72 ÷ 60 ÷ 60 (= 0.02) or 60 ÷ 60 × 1000 (= 3.6)	20	3	M1 for at least **one** of × 1000 or ÷ 60
	$\frac{72}{60\times 60}\times 1000$			M1 (dep) for a complete method
				A1
				Total 3 marks

Question	Working	Answer	Mark	Notes
15 (a)	6×25 + 6×45 (= 150 + 270 = 420)	20	4	M1 for 6×25 (=150) or 6×45 (=270)
	"150" + "270" – 350 (= 70) or "420" – 350			M1
	$\frac{70}{350} \times 100$			M1 (dep on M2)
				A1
	Alternative scheme			
	6×25 + 6×45 (= 150 + 270 = 420)	20	4	M1 for 6×25 (=150) or 6×45 (=270)
	$\frac{420}{350} \times 100 = 120$			M1
	"120" – 100			M1 (dep on M2)
				A1
(b)	500 000 ÷ 8 (=62 500)	6 250 000	3	M1
	$500\,000 \div 8 \times 100$			M1 for a complete method
				A1
				Total 7 marks

Question	Working	Answer	Mark	Notes
16	eg $m = \frac{1}{2}$ or $y = \frac{1}{2}x + c$		4	M1 for gradient = $\frac{1}{2}$
	eg $7 = \frac{1}{2} \times 4 + c$ or $y - 7 = \frac{1}{2}(x - 4)$			M1 for substituting (4,7) into an equation with gradient = $\frac{1}{2}$
	eg $\frac{1}{2}x + 5 = 0$ or $-7 = \frac{1}{2}(x - 4)$			M1 Inputting $y = 0$ into their correct equation
		(−10, 0)		A1 SC B2 for an answer of (18,0) or (0.5,0) oe or (7.5,0) oe
				Total 4 marks

Question	Working	Answer	Mark	Notes
17		$\frac{25}{56}$	4	M1 for $\frac{a}{8}\times\frac{b}{7}\times\frac{c}{6}$ where $a < 8$, $b < 7$, $c < 6$
	eg P(o, o, o) = $\frac{5}{8}\times\frac{4}{7}\times\frac{3}{6}\left(=\frac{60}{336}=\frac{5}{28}=0.178(571...)\right)$ or P(e, e, o) = $\frac{3}{8}\times\frac{2}{7}\times\frac{5}{6}\left(=\frac{30}{336}=\frac{5}{56}=0.0892(857...)\right)$			M1 for a complete method to find P(o, o, o) or P(o, e, e) or P(e, o, e) or P(e, e, o)
				M1 for a complete method to find P(o, o, o) **and** at least one of P(o, e, e), P(e, o, e), P(e, e, o)
				A1 oe $\frac{150}{336}$, 0.446(428571..) SC B2 for $\frac{260}{512}\left(=\frac{65}{128}=0.507(8125)\right)$, B1 for $\frac{170}{512}\left(=\frac{85}{256}=0.332(03125)\right)$
				Total 4 marks

Question	Working	Answer	Mark	Notes
18	8.35, 8.45, 6.25, 6.35, 0.265, 0.275		3	M1 For sight of 8.35, 8.45, 6.25, 6.35, 0.265 or 0.275
	$(a =)\dfrac{8.45-6.25}{0.265}$			M1 $a=\dfrac{UB-LB_1}{LB_2}$ Where $8.4 < UB \leq 8.45$ **and** $6.25 \leq LB_1 < 6.3$ **and** $0.265 \leq LB_2 < 0.27$
		8.3		A1 8.3(018867...) dep on M2
				Total 3 marks

Question	Working	Answer	Mark	Notes
19	eg $(4x + 3)(x – 2)$ or $(x =)$ $\dfrac{-(-5)\pm\sqrt{(-5)^2-4\times4\times(-6)}}{2\times4}$		4	M1 first step to finding the critical values
	$(x =) -\frac{3}{4}$ and 2			A1 for two correct critical values
				M1 (dep on two critical values having been found) for a diagram showing the inequalities **OR** $x < a$ and $x > b$ where a is their lower critical value and b is their upper critical value **OR** $x > 2$ **OR** $x < \dfrac{-3}{4}$ **OR** $\dfrac{-3}{4} > x > 2$
		$x < -\frac{3}{4}$ $x > 2$		A1 for both correct inequalities
				Total 4 marks

Question	Working	Answer	Mark	Notes
20	$\frac{4}{3}\times\pi\times R^3-\frac{4}{3}\times\pi\times1.2^3$ or $\frac{4}{3}\times\pi\times(1.2+t)^3-\frac{4}{3}\times\pi\times1.2^3$	3.9	5	M1 for an expression for the volume of the inner sphere
	$\left(\frac{4\pi}{3}R^3-\frac{4}{3}\times\pi\times1.2^3\right)\times2700=1980$			M1
	$\frac{4\pi}{3}R^3=\frac{4}{3}\times\pi\times1.2^3+\frac{1980}{2700}$ = 7.238229474 + 0.7333333 = 7.97(1562807)			M1 for a correct expression **or** sight of 7.23(8229474) + 0.73(33333) **or** sight of 7.97(1562807)
	$R=\sqrt[3]{\left(\frac{3}{4\pi}\times(\frac{4}{3}\times\pi\times1.2^3+\frac{1980}{2700})\right)}$ =1.2392… 1.2392 − 1.2 = 0.0392			M1 for a correct expression **or** sight of $\sqrt[3]{1.90(3070437)}$ **or** sight of 1.23(9229151) **or** sight of 0.0392(29151)
				A1 for 3.9 – 3.92
				Total 5 marks

Question	Working	Answer	Mark	Notes
21	$\frac{(2x+5)(2x-5)}{(5x+7)(x-1)} \times \frac{2(2x-5)-3(x-3)}{(x-3)(2x-5)}$ $\frac{(2x+5)(2x-5)}{(5x+7)(x-1)} \times \frac{x-1}{(x-3)(2x-5)}$ $\frac{2x+5}{(5x+7)(x-3)}$	$\frac{2x+5}{(5x+7)(x-3)}$	4	M1 For $4x^2 - 25 = (2x + 5)(2x - 5)$ or $5x^2 + 2x - 7 = (5x + 7)(x - 1)$
				M1 $\frac{2}{x-3} - \frac{3}{2x-5} = \frac{2(2x-5)-3(x-3)}{(x-3)(2x-5)}$ oe
				M1 $\frac{(2x+5)(2x-5)}{(5x+7)(x-1)} \times \frac{x-1}{(x-3)(2x-5)}$ oe may be partially simplified
				A1 Denominator may be expanded eg $\frac{2x+5}{5x^2-8x-21}$ isw for incorrect denominator expansion
				Total 4 marks

					Mean score of students achieving grade:						
Question	**Skill tested**	**Mean score**	**Max score**	**Mean %**	**ALL**	**9**	**8**	**7**	**6**	**5**	**4**	**3**
Q01	Statistical measures	1.63	2	82	1.63	1.97	1.87	1.72	1.38	1.15	0.84	0.29
Q02	Measures	2.77	3	92	2.77	2.96	2.88	2.80	2.72	2.60	2.26	2.17
Q03	Statistical measures	3.37	4	84	3.37	3.93	3.74	3.42	3.04	2.55	2.14	1.84
Q04	Applying number	3.58	4	90	3.58	3.99	3.72	3.72	3.37	3.17	2.68	1.29
Q05	Ratio and proportion	2.77	3	92	2.77	2.94	2.92	2.85	2.76	2.45	2.28	1.60
Q06a	Algebraic manipulation	1.92	2	96	1.92	1.99	1.96	1.95	1.91	1.85	1.66	1.54
Q06b	Algebraic manipulation	1.90	2	95	1.90	1.98	1.96	1.95	1.92	1.82	1.52	1.33
Q06c	Algebraic manipulation	1.81	2	91	1.81	1.99	1.92	1.91	1.74	1.52	1.31	1.08
Q07	Linear equations	2.56	3	85	2.56	2.98	2.86	2.74	2.47	1.85	0.89	0.46
Q08	Measures	2.66	3	89	2.66	2.97	2.91	2.81	2.43	2.09	1.84	1.75
Q09	Percentages	2.38	3	79	2.38	2.87	2.63	2.43	2.11	1.64	1.60	1.04
Q10	Pythagoras' Theorem	2.65	3	88	2.65	2.98	2.87	2.82	2.57	2.11	1.53	0.62
Q11	3D shapes and volume	3.07	4	77	3.07	3.84	3.46	3.32	2.62	1.95	1.28	0.44
Q12	Polygons	3.28	4	82	3.28	3.88	3.77	3.56	2.85	2.30	1.37	0.79
Q13	Trigonometry	3.09	4	77	3.09	3.83	3.50	3.22	2.78	1.99	1.31	0.38
Q14	Measures	2.10	3	70	2.10	2.74	2.25	2.08	1.78	1.36	1.05	1.00
Q15a	Percentages	3.35	4	84	3.35	3.90	3.63	3.54	3.07	2.46	2.17	1.32
Q15b	Percentages	1.83	3	61	1.83	2.76	2.10	1.67	1.23	0.88	0.75	0.52
Q16	Graphs	1.71	4	43	1.71	3.52	2.29	1.02	0.32	0.09	0.02	0.00
Q17	Probability	1.06	4	27	1.06	2.26	1.18	0.66	0.33	0.05	0.02	0.00
Q18	Degree of accuracy	1.84	3	61	1.84	2.81	2.33	1.88	1.10	0.45	0.23	0.04
Q19	Inequalities	1.95	4	49	1.95	3.50	2.29	1.51	0.92	0.59	0.32	0.00
Q20	3D shapes and volume	0.97	5	19	0.97	2.64	0.72	0.29	0.15	0.06	0.00	0.00
Q21	Algebraic manipulation	1.86	4	47	1.86	3.62	2.33	1.24	0.67	0.30	0.11	0.04
		56.11	**80**	**70**	**56.11**	**72.85**	**62.09**	**55.11**	**46.24**	**37.28**	**29.18**	**19.54**

Suggested Grade Boundaries based on peformance of students in Summer 2018

9	8	7	6	5	4	3
66	58	50	42	33	24	19