

GCSE Mathematics (9-1) Practice Tests

Set 8 – Paper 2H mark scheme

Question	Working	Answer	Marks	Notes
1	$\frac{3450}{2+6+7} (=230)$ or $\frac{2}{2+6+7} \times 3450 (=460)$ or $\frac{7}{2+6+7} \times 3450 (=1610)$ or $\frac{7-2}{2+6+7} \left(=\frac{1}{3} \right)$		3	M1
	$(7-2) \times "230"$ or $7 \times "230" - 2 \times "230"$ or "1610" - "460" or $"\frac{1}{3}" \times 3450$			M1
		1150		A1
2	$\frac{8}{100} \times 20000 (=1600)$		4	M1
	$20000 + \frac{8}{100} \times 20000 (=21600)$ or $(20\ 000 - 19200) + \frac{8}{100} \times 20000 (=2400)$			M1 Award M2 for 20000×1.08 or 21600
	$\frac{"21600" - 19200}{19200} (\times 100)$ or $\frac{"2400"}{19200} (\times 100)$ or "21600" \div 19200 $(\times 100)$ oe			M1 or for 1.125 or $\frac{9}{8}$ or 112.5%
		12.5		A1 oe
3	$170 \div 2 (=85)$ or $170 \div 2 \times 7 (=595)$ or $7 \div 2$ $(=3.5)$	510	5	M1
	$7 \times "85" + 170 (=765)$ or $9 \times "85" (=765)$ or "595" + 170 (=765) or $170 \times "3.5" + 170 (=765)$			M1 award of this mark implies the first M1
	"765" \div 3 (=255) or "765" \div 3 \times 5 (=1275)			M1 dep on M2
	"255" \times 2 or "1275" - "765" or "1275" \div 5 \times 2			M1
				A1

Question		Working	Answer	Marks		Notes
4	(a)	$2 \times \pi \times 0.56 \times 1.6$		2	M1	Award even if part of a calculation including 1 or 2 circles
			5.63		A1	awrt 5.63
	(b)	$\frac{0.6}{1.6} (=0.375)$ or $\frac{1.6}{0.6} (= \frac{8}{3} = 2.\dot{6})$ or $\frac{r}{0.56} = \frac{0.6}{1.6}$ or $(r =) \frac{0.56 \times 0.6}{1.6}$ or $0.56 \div 2.\dot{6}$ oe		2	M1	Correct scale factor (given as a fraction or ratio) or correct equation in r or a correct expression for r . Allow 2.6666... to 1 dp rounded or truncated
			0.21		A1	Allow 21 cm oe if units shown
5		$9.7^2 + 3.5^2 (=106.34)$	32.4	4	M1	M1 for the use of MN and a correct angle (70.1... or 70.2, 19.8...) in a correct trig statement eg $\cos 70.2 = \frac{3.5}{MN}$
		$\sqrt{9.7^2 + 3.5^2}$ or $\sqrt{"106.34"}$ (=10.3...)			M1	M1 for a complete method to find MN eg $MN = \frac{3.5}{\cos 70.2}$ (=10.3...)
		$\pi \times "10.3..."$ or $2 \times \pi \times \frac{"10.3..."}{2}$			M1	dep on M2
					A1	for answer in range 32.3 – 32.41

Question	Working	Answer	Marks	Notes
6	$\cos 52 = \frac{12.6}{x}$ or $\sin 38 = \frac{12.6}{x}$		3 M1	Or use of tan to find horizontal side $12.6 \times \tan 52$ or $\frac{12.6}{\tan 38}$ (=16.12...) and a correct first stage to find x eg $x^2 = 12.6^2 + "16.12..."^2$ or $\sin 52 = \frac{"16.12..."}{x}$ oe Allow correct first stage of sine rule
	$(x =) \frac{12.6}{\cos 52}$ or $\frac{12.6}{\sin 38}$ (= $\frac{12.6}{0.61566...}$) or		M1	Accept decimal correct to at least 3SF Or $(x =) \sqrt{12.6^2 + "16.12..."^2}$ or $(x =) \frac{"16.12..."}{\sin 52}$ Allow fully rearranged sine rule
		20.5	A1	20.4 – 20.5
7	eg $7x + 7y = 105 -$ $5x + 5y = 75 +$ $7x - 5y = 3$ $7x - 5y = 3$ $7(15 - y) - 5y = 3$ or $7x - 5(15 - x) = 3$ oe		3 M1	Correct method to eliminate x or y : coefficients of x or y the same and correct operation to eliminate selected variable (condone any one arithmetic error in multiplication) or writing x or y in terms of the other variable and correctly substituting
	$"6.5" + y = 15$ or $x + "8.5" = 15$ or $7 \times "6.5" - 5y = 3$ or $7x - 5 \times "8.5" = 3$		M1	dep Correct method to find second variable using their value from a correct method to find first variable or for repeating above method to find second variable
		$x = 6.5, y = 8.5$	A1	dep on first M1

Question		Working	Answer	Marks		Notes
8	a	$\frac{4}{100} \times 160\,000$ oe (=6400)	141 558	3	M1	M2 for $160\,000 \times 0.96^3$ or $160\,000 \times 0.96^4$ (=135 895.44..) If not M2 then award M1 for $160\,000 \times 0.96$ (=153 600) or $160\,000 \times 0.96^2$ (=147 456)
		$\frac{4}{100} \times (160\,000 - \text{"6400"})$ (= 6144) $\frac{4}{100} \times (160\,000 - \text{"6400"} - \text{"6144"})$ (= 5898.24) 160 000 – “6400” – “6144” – “5898.24”			M1	for a complete method (condone 4 years rather than 3)
						accept $(1 - 0.04)$ in place of 0.96 throughout
					A1	for 141 557.76 - 141 558
	b	E.g. $252\,000 \div 1.05$	240 000	3	M2	If not M2 then M1 for $x \times 1.05 = 252\,000$ or $252\,000 \div 105$ oe
					A1	NB: An answer of 239 400 scores M0 M0 A0

Question	Working	Answer	Marks	Notes
9	E.g. $\tan 72 = \frac{12.8}{a}$ or $\tan(90 - 72) = \frac{o}{12.8}$ or $\sin 72 = \frac{12.8}{h}$ or $\cos(90 - 72) = \frac{12.8}{h}$	110	5 M1	substitutes correctly into a trig ratio (including the Sine rule)
	E.g.(shortest side) = $\frac{12.8}{\tan 72}$ or $12.8 \tan(90 - 72)$ or 4.15(89...) or 4.16 or (hypotenuse =) $\frac{12.8}{\sin 72}$ or $\frac{12.8}{\cos(90 - 72)}$ or 13.4(58...) or 13.5		M1	for a complete method to find one side of the triangle
	One of (shortest side =) $\frac{12.8}{\tan 72}$ or $12.8 \tan(90 - 72)$ or 4.15(89...) or 4.16 or $\sqrt{13.4...^2 - 12.8^2}$ AND One of (hypotenuse =) $\frac{12.8}{\sin 72}$ or $\frac{12.8}{\cos(90 - 72)}$ or 13.4(58...) or 13.5 or $\sqrt{12.8^2 + 4.15...^2}$		M1	for a complete method to find both missing sides of triangle NB Could use Pythagoras's theorem with side found – must be a complete correct method

Question	Working	Answer	Marks		Notes	
10	$V = \frac{4}{3} \times \pi \times 1.5^3 (= 14.1(37)\dots \text{ or } \frac{9}{2} \pi)$		3	M1	Correct expression for volume.	
	$D = \frac{109.6}{\frac{4}{3} \pi \times 1.5^3} \text{ oe}$			M1	dep	
		7.75		A1	7.75 – 7.78	
11	$2x^2 - x + 6x - 3$ or $2x^2 + 5x - 3$ or $x^2 + 3x - 5x - 15$ or $x^2 - 2x - 15$ or $2x^2 - 10x - x + 5$ or $2x^2 - 11x + 5$	$2x^3 - 5x^2 - 28x + 15$	3	M1	for expansion of any 2 of the 3 brackets (at least 3 of 4 terms correct)	
	eg. $2x^3 + 5x^2 - 3x - 10x^2 - 25x + 15$ or $2x^3 - 4x^2 - 30x - x^2 + 2x + 15$ or $2x^3 - 11x^2 + 5x + 6x^2 - 33x + 15$			M1	(dep) ft for at least half of their terms correct in second expansion (the correct number of terms must be present)	
				A1		
12	(a)	$(28 + 32) \times 72.6 (=4356)$ or $28 \times 75 (=2100)$		4	M1	Expression for total of both classes together or total for class A
		$(28 + 32) \times 72.6 - 28 \times 75 (=2256)$			M1	Expression for total of class B
		$\frac{(28+32) \times 72.6 - 28 \times 75}{32} (= "2256" \div 32)$			M1	Correct calculation for mean of class B
		70.5		A1		
	(b)	Highest in A = $39 + 57 (= 96)$ Highest in B = $33 + 60 (= 93)$		3	M1	for $39 + 57 (=96)$ or $33 + 60 (=93)$
		$(39 + 57) - 33$			M1	or for $33 - "96"$ or 33 to $"96"$ oe
		63		A1		
13		$8.305 - 0.655$		2	M1	For either bound correct (used or seen). Accept $0.654\dot{9}$
		7.65		A1	dep on correct method shown	

Question	Working	Answer	Marks	Notes
14	$BE^2 = 10^2 + 24^2 + 8^2$ $(= 100 + 576 + 64 = 740)$ $(BE = 2\sqrt{185} = 27.202 \dots)$	$BD^2 = 8^2 + 24^2$ $(= 64 + 576 = 640)$ $(BD = 8\sqrt{10} = 25.298 \dots)$	M1	Complete method to find BE or BE^2 or BD or BD^2
	$\sin DBE = \frac{10}{\sqrt{740}}$ $(= 0.3676 \dots)$	$\tan DBE = \frac{10}{\sqrt{640}}$ $(= 0.3952 \dots)$ or $\cos DBE = \frac{\sqrt{640}}{\sqrt{740}}$ $(= 0.9428 \dots)$	M1	Allow use of sine or cosine rule $\sin DBE = \frac{10 \sin 90}{\sqrt{740}}$ or $\cos DBE = \frac{640 + 740 - 10^2}{2 \times \sqrt{640} \times \sqrt{740}}$ ($= 0.9299 \dots$)
		21.6	A1	21.5 – 21.6

Question		Working	Answer	Marks		Notes
15	(a)		-6, 4, 0, -2, 4	2	B2	Award B1 for 2, 3 or 4 correct.
	(b)		correct curve	2	B2	For correct smooth curve. If B2 not awarded, award B1 for at least 5 points plotted correctly fit from table dep on B1 or B2 in (a) (plots ± 1 sq)
	(c)	$x^3 - 2x^2 - 3x + 4 = -2x + 3$		4	M1	
		Plot $y = -2x + 3$			M1	Sufficient to cross curve at least once.
		-0.8 or 0.6 or 2.2			A1	Any one correct x value at intersection of graphs (or one or more points given as coordinates) ft dep on second M1 (Award even if curve in (a) is incorrect)
			-0.8, 0.6 2.2		A1	Accept -0.9 to -0.7 Accept 0.4 to 0.7 Accept 2.1 to 2.4 (not coordinates) ft (± 1 square) dep on second M1 must be 3 values
16		E.g. $\left(\frac{y^8}{256x^{20}}\right)^{\frac{1}{4}}$ or $\left(\frac{4x^5}{y^2}\right)^{-1}$ or $\frac{x^{-5}}{4y^{-2}}$ or $\frac{\frac{1}{4}x^{-5}}{y^{-2}}$ or $k\frac{y^a}{x^b}$ or $\frac{ky^a}{x^b}$ with 2 of $k = \frac{1}{4}$ oe, $a = 2, b = 5$ or $\frac{y^a}{mx^b}$ with 2 of $m = 4, a = 2, b = 5$	$\frac{y^2}{4x^5}$	2	M1	for a correct first step leading to a correct partially simplified expression
					A1	for $\frac{y^2}{4x^5}$ or $\frac{1}{4}\frac{y^2}{x^5}$ or $0.25\frac{y^2}{x^5}$ or $0.25y^2x^{-5}$

Question	Working	Answer	Marks	Notes
17	eg $4 \times 5 + 1 \times 10 = 30$ small squares for 6 babies or $30 \div 6$ or 5 small squares represent 1 baby or height of first bar $= \frac{4}{0.5} (= 8)$ or height of last bar $= \frac{2}{1} (= 2)$ or 1 small square vertically = FD of 2 or 1cm vertically = FD of 10 oe		3 M1	Start working with area being proportional to frequency or show the height of the first or last bar or show a correct scale on the frequency density scale, with no inconsistent values. eg could be awarded by seeing total of little squares $\div 5$ oe
	eg $(4 \times 5 + 20 \times 4 + 25 \times 2 + 15 \times 4) \div 5$ or $4 + 40 \times 0.4 + 50 \times 0.2 + 30 \times 0.4$ or $4 + 16 + 10 + 12$ oe		M1	Fully correct method, allow one error in products but must be the sum of 4 parts
18	$\angle EDC = 180 - 42 (= 138)$		5 M1	May be marked on diagram.
	$(2 \times 6 - 4) \times 90 (= 720)$		M1 independent	Method to find sum of interior angles of hexagon or the correct sums for the interior angles of shapes used (eg 540° & 180° if the line through FE to point on AB drawn or 720° and 180° if line drawn from E parallel to AB or 540° & 180° if line through FE extended and joined to line through CB extended) oe
	eg “138” + 42 + 50 + 96 + 144 + $E' =$ “720” or “138” + 42 + 50 + 96 + 144 + $(360 - E) =$ “720” or $42 + 144 +$ “138” + $(50 + 96) + DEP =$ “540” (where P is on AB and FE extended)		M1	dep on previous M marks Equation for E or E' where E is the obtuse angle of the hexagon and E' is the interior (reflex) angle or for an answer of 250 from correct working
	$E' =$ “720” – “138” – 42 – 50 – 96 – 144 (= $720 - 470 = 250$) and $E = 360 -$ “250” or $E =$ “138” + 42 + 50 + 96 + 144 + 360 – “720” (= $830 - 720$)		M1	A completely correct calculation for the correct angle E
		110	A1	from no incorrect working

Question	Working	Answer	Marks		Notes
19	$14^2 = 10^2 + 8^2 - 2 \times 10 \times 8 \times \cos A$ or $\cos A = \frac{10^2 + 8^2 - 14^2}{2 \times 10 \times 8}$ oe		3	M1	Correct substitution in cosine rule for any angle or for 44.4... or 34.047....(the other 2 angles to 1dp or better)
				M1	$\cos^{-1}\left(\frac{10^2 + 8^2 - 14^2}{2 \times 10 \times 8}\right)$ oe ie \cos^{-1} of the correct angle or a fully correct method to find the largest angle eg $180 - \cos^{-1}\left(\frac{196 + 100 - 64}{280}\right) - \cos^{-1}\left(\frac{196 + 64 - 100}{224}\right)$ oe
		101.5		A1	101.5 to 101.6
20	$1 - \frac{98}{125} \left(= \frac{27}{125} \right)$ or 0.216 or $125 - 98 (=27)$	$\frac{2}{5}h$ oe	4	M1	
	$\sqrt[3]{\frac{27}{125}} \left(= \frac{3}{5} \right)$ or $\sqrt[3]{\frac{125}{27}} \left(= \frac{5}{3} \right)$			M1	for the length scale factor may be seen as a ratio E.g. 3 : 5
	$1 - \frac{3}{5}$ or $h - \frac{3}{5}h$ oe			M1	
				A1	for $\frac{2}{5}h$ oe (may not be simplified)

Practice Tests Set 8 – Paper 2H

Question	Skills tested	Mean score	Max score	Mean %	Edexcel averages:	Mean score of students achieving grade							
					ALL	9	8	7	6	5	4	3	
Q01			3										
Q02			4										
Q03	Ratio and proportion	3.91	5	78	3.91	4.63	4.29	3.86	3.46	2.99	2.38	1.71	
Q04a	3D shapes and volume	1.86	2	93	1.86	1.92	1.91	1.88	1.87	1.79	1.66	1.48	
Q04b	Similarity	1.77	2	89	1.77	1.98	1.94	1.85	1.72	1.45	0.96	0.46	
Q05	Pythagoras' Theorem	3.47	4	87	3.47	3.90	3.80	3.59	3.30	2.82	1.99	1.14	
Q06	Trigonometry	2.48	3	83	2.48	2.93	2.81	2.60	2.26	1.74	1.03	0.45	
Q07	Simultaneous linear equations	2.57	3	86	2.57	2.97	2.88	2.71	2.37	1.90	1.18	0.54	
Q08	Trigonometry	3.70	5	74	3.70	4.78	4.40	3.84	2.94	1.91	0.87	0.32	
Q08a	Percentages	2.57	3	86	2.57	2.91	2.78	2.60	2.39	2.10	1.64	1.27	
Q08b	Statistical measures	2.39	3	80	2.39	2.92	2.75	2.44	2.06	1.53	1.01	0.45	
Q10	Measures	2.32	3	77	2.32	2.85	2.62	2.34	2.05	1.59	0.98	0.51	
Q11	Algebraic manipulation	2.15	3	72	2.15	2.82	2.49	2.10	1.65	1.21	0.78	0.44	
Q12a	Statistical measures	2.40	4	60	2.40	3.53	2.86	2.19	1.61	0.89	0.42	0.11	
Q12b	Percentages	2.28	3	76	2.28	2.95	2.74	2.27	1.76	1.20	0.70	0.45	
Q13	Degree of accuracy	1.25	2	63	1.25	1.87	1.62	1.16	0.68	0.35	0.15	0.04	
Q14	3D shapes and volume	1.67	3	56	1.67	2.66	2.09	1.44	0.81	0.41	0.15	0.05	
Q15a	Graphs	1.76	2	88	1.76	1.95	1.87	1.76	1.65	1.49	1.29	1.10	
Q15b	Graphs	1.49	2	75	1.49	1.80	1.61	1.46	1.30	1.11	0.88	0.67	
Q15c	Graphs	0.65	4	16	0.65	1.79	0.41	0.11	0.03	0.01	0.00	0.00	
Q16	Algebraic manipulation	0.58	2	29	0.58	1.28	0.57	0.27	0.12	0.06	0.03	0.01	
Q17	Graphical representation of data	1.26	3	42	1.26	2.15	1.41	0.99	0.63	0.36	0.17	0.05	
Q18	Angles, lines and triangles	1.80	5	36	1.80	3.14	2.02	1.31	0.83	0.49	0.30	0.15	
Q19	Mensuration of 2D shapes	1.22	3	41	1.22	2.37	1.39	0.73	0.38	0.17	0.06	0.03	
Q20	Similarity	0.63	4	16	0.63	1.44	0.46	0.29	0.21	0.14	0.13	0.08	
		52.68	80	66	52.68	68.46	58.53	50.41	42.45	33.68	23.98	15.47	

Suggested Grade Boundaries based on performance of students in Summer 2018

9	8	7	6	5	4	3
63	55	47	38	29	20	12