Practice Tests Set 14 – Paper 2H-3H mark scheme, performance data and suggested grade boundaries

Q	Working	Answer	Mark	Notes
1	$\tan x = \frac{3.4}{4.7}$ oe eg $\cos x = \frac{4.7}{\sqrt{3.4^2 + 4.7^2}}$ oe		M1	or $\sin x = \frac{3.4 \sin 90}{\sqrt{3.4^2 + 4.7^2}}$ oe
	$(x =) \tan^{-1}\left(\frac{3.4}{4.7}\right)$ oe eg $(x =) \cos^{-1}\left(\frac{4.7}{\sqrt{3.4^2 + 4.7^2}}\right)$		M1	or $(x =) \sin^{-1}\left(\frac{3.4 \sin 90}{\sqrt{3.4^2 + 4.7^2}}\right)$ oe
		35.9	A1	accept 35.7 - 36.1
				Total 3 marks

Q	Working		Answer	Mark	Notes	
2 a	1.04 × 3 130 000 oe				M2 complete method to increase salary by 4% M1 for 0.04 × 3 130 000 oe (= 125 200)	
			3 255 200	3	A1	
b	for 0.15 × 750 000 oe (=112 500) **or** 0.85 × 750 000 oe (=637 500)	**OR** 750 000 × 0.85^3			M1 For method to find depreciation for 1 year or value after 1 year	**or** M2 for 750 000 × 0.85^3 (= 460 593.75) **or** 750 000 × 0.85^4 (= 391 504.69) (M1 for 750 000 × 0.85^2 (= 541 875)
	0.85 × "637 500" oe (= 541 875) 0.85 × "541 875" oe(= 460 593.75)				M1 for completing method	
			460 594	3	A1 accept 460 593 – 460 594	
					SC: if no other marks gained award M1 for 0.55 × 750 000 oe **(**= 412 500) **or** 0.45 × 750 000 oe **(**= 337 500) accept (1 – 0.15) as equivalent to 0.85 throughout	
						Total 6 marks

Q		Working	Answer	Mark	Notes
3	a		$50 < L \leq 60$	1	B1 oe eg 50 - 60
	b	$25 \times 6 + 35 \times 26 + 45 \times 31 + 55 \times 40 + 65 \times 17$ $(150 + 910 + 1395 + 2200 + 1105)(= 5760)$			M2 For correct products using midpoints (allow one error) with intention to add. M1 for products using frequency and a consistent value within the range (allow one error) with intention to add or correct products using midpoints (allow one error) without addition
		"5760" ÷ "120"			M1 dep on M1
			48	4	A1
					Total 5 marks

4	E.g. $1 - 0.2 (= 0.8)$ **or** $100(\%) - 20(\%) (= 80(\%))$ **or** $\frac{1080}{80} (= 13.5)$ oe		3	M1
	E.g. $1080 \div 0.8$ or $1080 \div 80 \times 100$ or '13.5' $\times 100$ $1080 \times 100 \div 80$			M1 for a complete method
		1350		A1
				Total 3 marks

Q	Working	Answer		Mark	Notes
5	$8.5^2 - (8 \div 2)^2$ (= 56.25) **or** $\cos x = \frac{4}{8.5}$ oe			M1	**or** eg $\cos A = \frac{8^2 + 8.5^2 - 8.5^2}{2 \times 8 \times 8.5}$
	$\sqrt{"56.25"}$ (= 7.5) **or** $x = \cos^{-1}\left(\frac{4}{8.5}\right)$ (= 61.927...) oe			M1	**or** eg $(A =) \cos^{-1}\left(\frac{8^2 + 8.5^2 - 8.5^2}{2 \times 8 \times 8.5}\right)$ (61.927...) (other angle = 56.144...)
	8 × "7.5" ÷ 2 oe **or** 0.5 × 8 × 8.5 × sin "61.927..."			M1	**or** eg 0.5 × 8.5 × 8 × sin"61.927..." oe
		30	4	A1	
					Total 4 marks

6	$\frac{x+10}{2} = 9$ **or** $x = 8$		4	M1	(indep)
	$\frac{4+7+x+10+y+y}{6} = 11$ oe **or** '66' – 4 – 7 – 10 (= 45)			M1	where x may be a number $7 < x < 10$
	(y =) (6 × 11 – 4 – 7 – 10 – '8') ÷ 2			M1	ft their median provided $7 < x < 10$ for a fully correct method
		x = 8 and y = 18.5 oe		A1	
					Total 4 marks

Q	Working	Answer	Mark	Notes
7	$\pi \times 3^2 \times h = 72\pi$ oe			M1 Allow use of 3.14... or $\frac{22}{7}$ for π and use of 226... for 72π
	$h = 72\pi \div (\pi \times 3^2)$ oe **or** $h = 8$			M1 method to isolate h (may be seen in several stages)
	$2 \times \pi \times 3^2$ (= 18π or 56.54...) **or** $2 \times \pi \times 3 \times$ "8" oe (= 48π or 150 - 151)			M1 method to find the area of the two circles **or** curved surface area – use of their h, dep on 1st M1 (NB may get this mark for total area of 2 circles with no previous marks awarded)
	$2 \times \pi \times 3^2 + 2 \times \pi \times 3 \times$ "8" oe (= 66π)			M1 method to find total surface area ft their h dep on 1st M1, including intention to add, to find the total surface area
		207	5	A1 accept 207-208
				Total 5 marks

Q	Working	Answer	Mark	Notes
8	(10 – 2) × 180 oe (= 1440) **or** (6 – 2) × 180 oe (= 720)		4 M1	for a method to find the sum of the interior angles of a decagon or a hexagon
	'1440' – 148 – 2×150 – 2×168 – 2×134 – 2×125 (=138) **or** '1440' – 1302 (= 138) **or** '720' – 148÷2 – 150 – 168 – 134 – 125 (= 69) **or** '720' – 651 (= 69)		M1	Allow omission of one angle
	360 – '138' **or** 360 – 2 × '69'		M1	
		222	A1	
	Alternative method (exterior angles)			
	360 – 2×(180 – 125) – 2×(180 – 134) – 2×(180 – 168) – 2×(180 – 150) – (180 – 148) **or** 360 – 2×55 – 2×46 – 2×12 – 2×30 – 32		4 M2	If not M2 then award M1 for at least 3 or (180 – 125) , (180 – 134) , (180 – 168) , (180 – 150), (180 – 148) **or** at least 3 of 55, 46, 12, 30, 32
	180 + '42'		M1	
		222	A1	
				Total 4 marks

9	100 ÷ 28 440 (= 0.0035…) **or** 28 440 ÷ (60 × 60) (= 7.9)		3	M1
	'0.0035...' × 60 × 60 **or** 100 ÷ '7.9'			M1
		13		A1 for 12.65 – 13
				Total 3 marks

Q	Working	Answer	Mark	Notes	
10	$15 \times 60 \times 60$ (= 54 000) oe **or** $\frac{60}{12} \times 60 \times 15$ (= 4500) oe **or** $5 \times \frac{60}{12} \times 60$ (= 1500) oe		4	M1	M2 for $\frac{15 \times 60 \times 60 \times 5}{12}$ (= 22 500)
	'54000' ÷ 12 × 5 (= 22 500) oe **or** '4500' × 5 (= 22 500) oe **or** '1500' × 15 (=22 500) oe			M1	
	'22 500' × 0.002 oe			M1	dep on M2 for a complete method
		45		A1	
					Total 4 marks

Q	Working	Answer		Mark	Notes
11	*ADC* = 180 – 58 (= 122) **or** *EDF* = 122 **or** *CDE* = 58 **or** *ADF* = 58			M1	may be seen marked on the diagram
	e.g. *DEF* = 58 ÷ 2 **or** *DEF* = (180 – 122) ÷ 2			M1	complete method to find angle *DEF*
		29		A1	
			5	B2	dep on M2 for fully correct reasons for their method (B1 dep on M1 for one correct reason stated and used) e.g. Allied angles, co-interior angles, Alternate angles, Corresponding angles, Vertically opposite angles are equal (or Vertically opposite angles are equal), Angles on a straight line add up to 180°(or angles on a straight line add to 180°), Sum of two angles in a triangle are equal to opposite exterior angle, Angles in a triangle add up to 180°(or Angles in a triangle add up to 180°), Base angles in an isosceles triangle Angles in a quadrilateral add up to 360. (accept "4-sided shape"or parallelogram) Opposite angles of a parallelogram are equal
					Total 5 marks

Q	Working	Answer	Mark	Notes
12	$(AX =)$ (17.6 – 8.4) ÷ 2 (= 4.6)		6	M1 where X is the foot of the perpendicular from B to AD
	0.5 × (8.4 + 17.6) × h = 179.4 **or** 0.5 × '4.6' × h + 0.5 × '4.6' × h + 8.4 × h = 179.4 **or** 13 × h = 179.4			M1
	(h =) 179.4 ÷ '13' (=13.8) **or** (h =) 358.8 ÷ '26' (=13.8) oe			M1
	$\tan ABX = \frac{'4.6'}{'13.8'}$ **or** $\tan BAX = \frac{'13.8'}{'4.6'}$			M1 ft their h dep on second M1 $(AB =)\sqrt{'4.6'^2 + '13.8'^2} = \sqrt{211.6}$ = (14.546…) **and** one from $\sin ABX = \frac{'4.6'}{'\sqrt{211.6}'}$ or $\sin BAX = \frac{'13.8'}{'\sqrt{211.6}'}$ or $\cos ABX = \frac{'13.8'}{'\sqrt{211.6}'}$ or $\cos BAX = \frac{'4.6'}{'\sqrt{211.6}'}$ or $\sin ABX = \frac{'4.6' \times \sin 90}{'\sqrt{211.6}'}$ or $\cos ABX = \frac{'\sqrt{211.6}' + '13.8'^2 - '4.6'^2}{2 \times '\sqrt{211.6}' \times '13.8'}$
	$(ABX =) \tan^{-1}\left(\frac{'4.6'}{'13.8'}\right)$ (= 18.4) **or** $(BAX =) \tan^{-1}\left(\frac{'13.8'}{'4.6'}\right)$ (= 71.6)			M1
		108.4		A1 awrt 108.4
				Total 6 marks

Q	Working	Answer	Mark	Notes
13 (a)	35 ÷ 10 (=3.5), 45 ÷ 15 (=3), 75 ÷ 15 (=5), 40 ÷ 20 (=2), (8 ÷ 10) = 0.8		3	M1 for any two correct fd **or** two correct bars drawn of different widths
	35 ÷ 10 (=3.5) **and** 45 ÷ 15 (=3) **and** 75 ÷ 15 (=5) **and** 40 ÷ 20 (=2) **and** (8 ÷ 10) = 0.8			M1 for all correct fd **or** at least 3 correct bars drawn
				A1 for a fully correct histogram with 'frequency density' (or fd) and scale on the axis labelled or appropriate key (SC: B2 for all five bars drawn of correct width with heights in the correct ratio) (SC: B1 for three bars drawn of correct width with heights in the correct ratio)
(b)	$10 \times 5 + 40 + 8$ or $\frac{2}{3} \times 75 + 40 + 8$		2	M1 ft from their histogram in (a) for a correct method
		98		A1
				Total 5 marks

Q	Working	Answer	Mark	Notes
14	$8000\times\left(\frac{100+x}{100}\right)^6=8877.62$ oe **or** $8000\times\left(1+\frac{x}{100}\right)^6=8877.62$ oe **or** $8000\times(1+x\%)^6=8877.62$ **or** $8000\times y^6=8877.62$ oe		3	M1
	$\left(\frac{8877.62}{8000}\right)^{\frac{1}{6}}$ (=1.0175…) or $(1.1097...)^{\frac{1}{6}}$ (=1.0175…)			M1
		1.75		A1
				Total 3 marks

Q	Working	Answer	Mark	Notes
15	eg $\frac{4}{AC} = \tan 35$ oe **or** $\frac{AC}{4} = \tan 55$ oe **or** $\frac{AC}{\sin 55} = \frac{4}{\sin 35}$ oe **or** $CH = \frac{4}{\sin 35}$ oe (= 6.97...) **and** $\frac{AC}{"6.97"} = \cos 35$ oe **or** $CH = \frac{4}{\sin 35}$ oe (=6.97...) **and** $AC^2 = 6.97^2 - 4^2$ oe			M1 A correct trig statement involving AC **or** trig and then Pythagoras involving AC
	$(AC =) \frac{4}{\tan 35}$ oe eg $(AC =)$ 4tan55 (= 5.71...) **or** $(AC =) \frac{4\sin 55}{\sin 35}$ **or** "6.97" × cos35 oe **or** $(AC =)$ $\sqrt{"6.97"^2 - 4^2}$			M1 complete method to find AC
	$(BC =) \sqrt{"5.71"^2 - 5^2}$ (= 2.76...)			M1 complete method to find BC
	4 × 5 × "2.76..."			M1 method to find volume
		55.3	5	A1 accept 55.1 – 55.5
				Total 5 marks

16	eg 76 ÷ (5 + 2 – 3) oe (= 19) or $5x + 2x - 3x = 76$ **and** $x = 76 \div (5 + 2 - 3)$ (=19) oe			M1 For a correct method to find the value of 1 share
	3 × "19" (= 57)			M1
	"57" – 48.5(0)			M1
		8.5(0)	4	A1
				Total 4 marks

Q	Working	Answer	Mark	Notes
17	$\sqrt{\frac{300}{108}}$ **or** $\sqrt{\frac{108}{300}}$ **or** $\sqrt{\frac{25}{9}}$ oe **or** $\sqrt{\frac{9}{25}}$ oe **or** $\left(\frac{300}{108}\right)^3 = \left(\frac{V}{135}\right)^2$ oe			M1 for a correct linear scale factor (fraction or ratio) **or** for the use of $\left(\frac{A_1}{A_2}\right)^3 = \left(\frac{V_1}{V_2}\right)^2$
	$135 \times \left(\sqrt{\frac{300}{108}}\right)^3$ oe **or** $\sqrt{\frac{300^3}{108^3} \times 135^2}$ **or** $\sqrt{390625}$			M1
		625	3	A1
				Total 3 marks

18	(a)		2×3^{37}	1	B1
	(b)	$2 \times 3^{43} \times 2^4 \times 3^{37}$ **or** $2^5 \times 3^p$ ($p \neq 80$) **or** $2^q \times 3^{80}$ ($q \neq 5$)		2	M1
			$2^5 \times 3^{80}$		A1
					Total 3 marks

Q	Working	Answer	Mark	Notes
19	$y=-\frac{7}{2}x(+10)$ **or** (gradient =) $-\frac{7}{2}$		4	B1 for correct gradient which may be seen in an equation. Condone $-\frac{7}{2}x$
	$'-\frac{7}{2}'m=-1$ **or** $(m=)'\frac{2}{7}'$			M1 ft their gradient for use of $m_1 \times m_2 = -1$
	$-11='\frac{2}{7}'\times 6+c$ **or** $y--11='\frac{2}{7}'(x-6)$ oe			M1 ft dep on M1
		$\left(0, -\frac{89}{7}\right)$		A1 accept $\left(0, -12\frac{5}{7}\right)$ must be exact values
				Total 4 marks

Q	Working	Answer	Mark	Notes
20	5025 **or** 5.025 **or** 4975 **or** 4.975		4	B1 Accept $5024.\dot{9}$ for 5025 or $5.024\dot{9}$ for 5.025
	1.845×10^{-3} oe **or** 1.835×10^{-3} oe			B1 Accept $1.844\dot{9} \times 10^{-3}$ for 1.845×10^{-3}
	$\frac{5.025}{1.835\times10^{-3}} (= 2738.4...)$ oe			M1 for correct substitution into $\frac{m_{UB}}{v_{LB}}$ where $5 < m_{UB} \leq 5.025$ **and** $1.835 \times 10^{-3} \leq v_{LB} < 1.84 \times 10^{-3}$
		2738.4		A1 dep on correct working
				Total 4 marks

Practice Tests Set 14 – Paper 2H-3H mark scheme, performance data and suggested grade boundaries

Q	Working	Answer	Mark	Notes

					Edexcel averages: scores of candidates who achieved grade							
Qn	**Skill tested**	**Mean score**	**Max score**	**Mean %**	**ALL**	**9**	**8**	**7**	**6**	**5**	**4**	**3**
1	Trigonometry	2.32	3	77	2.32	2.98	2.94	2.89	2.55	2.04	1.07	0.24
2	Percentages	4.92	6	82	4.92	5.89	5.66	5.39	5.15	4.61	3.77	2.59
3	Statistical measures	3.68	5	74	3.68	4.83	4.64	4.42	3.93	2.98	1.99	0.85
4	Applying number	2.02	3	67	2.02	2.91	2.58	2.28	1.96	1.56	0.90	0.48
5	Trigonometry	2.31	4	58	2.31	3.79	3.47	3.02	2.18	0.92	0.20	0.04
6	Statistical measures	2.30	4	58	2.30	3.75	3.27	2.80	2.05	1.18	0.60	0.09
7	3D shapes and volume	2.90	5	58	2.90	4.62	4.06	3.49	2.72	1.62	0.76	0.12
8	Polygons	2.21	4	55	2.21	3.76	3.30	2.65	1.87	1.04	0.46	0.18
9	Measures	1.73	3	58	1.73	2.78	2.47	1.93	1.57	0.96	0.59	0.28
10	Applying number	2.31	4	58	2.31	3.62	3.02	2.55	2.07	1.57	1.02	0.62
11	Angles, lines and triangles	2.42	5	48	2.42	3.95	3.19	2.69	2.08	1.66	0.86	0.43
12	Trigonometry and Pythagoras' Theorem	2.73	6	46	2.73	5.02	3.70	3.06	2.13	1.27	0.54	0.34
13	Graphical representation of data	1.63	5	33	1.63	3.55	2.32	1.62	0.93	0.49	0.19	0.11
14	Percentages	1.08	3	36	1.08	2.31	1.65	0.96	0.75	0.32	0.09	0.02
15	Trigonometry and Pythagoras' Theorem	1.69	5	34	1.69	4.39	2.55	1.29	0.40	0.09	0.04	0.00
16	Ratio and proportion	1.36	4	34	1.36	3.19	1.75	1.02	0.79	0.48	0.09	0.00
17	Similarity	0.99	3	33	0.99	2.54	1.48	0.73	0.34	0.09	0.04	0.04
18	Integers	0.90	3	30	0.90	2.27	1.23	0.65	0.40	0.14	0.06	0.01
19	Graphs	1.03	4	26	1.03	2.99	1.35	0.54	0.17	0.06	0.01	0.00
20	Degree of accuracy	0.67	4	17	0.67	1.95	0.81	0.43	0.17	0.07	0.01	0.00
		38.88	**80**	**49**	**38.88**	**68.11**	**52.50**	**41.52**	**31.66**	**21.11**	**12.22**	**6.20**

Suggested grade boundaries

Grade	9	8	7	6	5	4	3
Mark	59	47	37	26	17	9	4