

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	3	A1 accept 35.7 - 36.1
				Total 3 marks

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

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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” $\div$ “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

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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...)
	$8 \times "7.5" \div 2$ oe or $0.5 \times 8 \times 8.5 \times \sin "61.927..."$			M1 or eg $0.5 \times 8.5 \times 8 \times \sin "61.927..."$ 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 $7 < x < 10$
	$(y =) (6 \times 11 - 4 - 7 - 10 - '8') \div 2$			M1 fit their median provided $7 < x < 10$ for a fully correct method
		$x = 8$ and $y = 18.5$ oe		A1
				Total 4 marks

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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)
	$2 \times \pi \times 3^2 (= 18\pi \text{ or } 56.54\dots)$ or $2 \times \pi \times 3 \times \text{“8”}$ oe ($= 48\pi$ 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)
	$2 \times \pi \times 3^2 + 2 \times \pi \times 3 \times \text{“8”}$ oe ($= 66\pi$)			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

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Q	Working	Answer	Mark	Notes
8	$(10 - 2) \times 180$ oe (= 1440) or $(6 - 2) \times 180$ 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' – $148 \div 2$ – 150 – 168 – 134 – 125 (= 69) or '720' – 651 (= 69)			M1 Allow omission of one angle
	$360 - '138'$ or $360 - 2 \times '69'$			M1
		222		A1
	Alternative method (exterior angles)			
	$360 - 2 \times (180 - 125) - 2 \times (180 - 134) - 2 \times (180 - 168) - 2 \times (180 - 150) - (180 - 148)$ or $360 - 2 \times 55 - 2 \times 46 - 2 \times 12 - 2 \times 30 - 32$		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	$100 \div 28\,440$ (= 0.0035...) or $28\,440 \div (60 \times 60)$ (= 7.9)		3	M1
	'0.0035...' $\times 60 \times 60$ or $100 \div '7.9'$			M1
		13		A1 for 12.65 – 13
				Total 3 marks

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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’ $\div 12 \times 5 (= 22\,500)$ oe or ‘4500’ $\times 5 (= 22\,500)$ oe or ‘1500’ $\times 15 (= 22\,500)$ oe			M1	
	‘22 500’ $\times 0.002$ oe			M1	dep on M2 for a complete method
		45		A1	
				Total 4 marks	

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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. $DEF = 58 \div 2$ or $DEF = (180 - 122) \div 2$			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. <u>Allied angles</u> , <u>co-interior angles</u> , <u>Alternate angles</u> , <u>Corresponding angles</u> , <u>Vertically opposite angles</u> are equal (or <u>Vertically opposite angles</u> are equal), <u>Angles on a straight line</u> add up to 180° (or angles on a straight line add to <u>180°</u>), Sum of <u>two angles</u> in a triangle are equal to <u>opposite exterior angle</u> , <u>Angles</u> in a <u>triangle</u> add up to 180° (or Angles in a <u>triangle</u> add up to <u>180°</u>), Base angles in an <u>isosceles triangle</u> <u>Angles</u> in a <u>quadrilateral</u> add up to 360. (accept “4-sided shape” or parallelogram) <u>Opposite angles</u> of a <u>parallelogram</u> are equal
				Total 5 marks

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Q	Working	Answer	Mark	Notes
12	$(AX=) (17.6 - 8.4) \div 2 (= 4.6)$		6	M1 where X is the foot of the perpendicular from B to AD
	$0.5 \times (8.4 + 17.6) \times h = 179.4$ or $0.5 \times '4.6' \times h + 0.5 \times '4.6' \times h + 8.4 \times h = 179.4$ or $13 \times h = 179.4$			M1
	$(h=) 179.4 \div '13' (=13.8)$ or $(h=) 358.8 \div '26' (=13.8)$ 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 $(AB=) \sqrt{'4.6'^2 + '13.8'^2} = \sqrt{211.6}$ $= (14.546\dots)$ 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 $\cos ABX = \frac{\sqrt{211.6}^2 + '13.8'^2 - '4.6'^2}{2 \times \sqrt{211.6} \times '13.8'}$
	$(ABX=) \tan^{-1} \left(\frac{'4.6'}{'13.8'} \right) (= 18.4)$ or $(BAX=) \tan^{-1} \left(\frac{'13.8'}{'4.6'} \right) (= 71.6)$			M1
		108.4		A1 awrt 108.4
				Total 6 marks

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Q	Working	Answer	Mark	Notes
13 (a)	$35 \div 10 (=3.5), 45 \div 15 (=3), 75 \div 15 (=5), 40 \div 20 (=2), (8 \div 10) = 0.8$		3	M1 for any two correct fd or two correct bars drawn of different widths
	$35 \div 10 (=3.5)$ and $45 \div 15 (=3)$ and $75 \div 15 (=5)$ and $40 \div 20 (=2)$ and $(8 \div 10) = 0.8$			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

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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
	$\left(\frac{8877.62}{8000} \right)^{\frac{1}{6}} (=1.0175\dots)$ or $(1.1097\dots)^{\frac{1}{6}} (=1.0175\dots)$			M1
		1.75		A1
				Total 3 marks

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

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

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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

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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

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20	5025 or 5.025 or 4975 or 4.975		4	B1 Accept 5024.9̇ for 5025 or 5.0249̇ for 5.025
	1.845×10^{-3} oe or 1.835×10^{-3} oe			B1 Accept 1.8449̇ $\times 10^{-3}$ for 1.845×10^{-3}
	$\frac{5.025}{1.835 \times 10^{-3}}$ (= 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

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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