Practice Tests Set 16 – Paper 2H-3H mark scheme, performance data and suggested grade boundaries

Q		Working	Answer	Mark	Notes
1		$8^2 + 15^2$ (= 289)	167	5	M1
		$\sqrt{8^2 + 15^2}$ (=17)			M1
		$\pi \times \left("\frac{17}{2}"\right)^2$ (= 226.98...) **or** 0.5 × 15 × 8 (= 60)			M1
		$\pi \times \left("\frac{17}{2}"\right)^2$ – 0.5 × 15 × 8 ("226.98" – "60")			M1
					A1 Accept answers which round to 167
					Total 5 marks

Q	Working	Answer	Mark	Notes
2 (a)		$70 < s \leq 80$	1	B1
(b)	$10 \times 45 + 16 \times 55 + 19 \times 65 + 23 \times 75 + 12 \times 85$ **or** $450 + 880 + 1235 + 1725 + 1020$ (= 5310)		4	M2 $f \times d$ for at least 4 products with correct mid-interval values and intention to add. If not M2 then award M1 for d used consistently for at least 4 products within interval (including end points) and intention to add **or** for at least 4 correct products with correct mid-interval values with no intention to add
	"5310" ÷ 80			M1 dep on at least M1 allow division by their $\sum f$ provided addition or total under column seen
		66.4		A1 accept 66.37 – 66.4
				Total 5 marks

Q		Working	Answer	Mark	Notes
3	(a)	520 – 465 (= 55) **or** $\frac{520}{465}$ (=1.118…)	11.8	3	M1
		$\frac{"55"}{465}\times 100$ **or** 100 ×("1.118" – 1) oe			M1
					A1 11.8 or better (11.827956...)
	(b)	0.12 × 550 oe (= 66)	484	3	M1 oe M2 for 0.88 × 550 oe
		550 – "66"			M1
					A1
					Total 6 marks

4	6 hrs 39 mins = 6.65 (hrs) or $6\frac{39}{60}$ or $6\frac{13}{20}$ or $\frac{133}{20}$ or 399 (mins)		3	B1
	Average speed = $\frac{429}{6.65}$ oe eg $\frac{429}{399}\times 60$			M1 Use of $S = D \div T$ (use of their time in hours) [allow 429 ÷ 6.39 if B0 awarded]
		64.5		A1 Awrt 64.5
				Total 3 marks

Q	Working		Answer	Mark	Notes	
5 (a)	for 0.035 × 40 000 oe (= 1400) **or** 1.035 × 40 000 oe (= 41 400)	**OR**		3	M1 for finding 3.5% **or** 103.5% of 40 000	**OR** M2 for 40 000 × 1.035^3 **or** 40 000 × 1.035^4 (= 45 900.92)
	1.035 × "41 400" oe (= 42 849) 1.035 × "42 849" oe (= 44 348.72)	40 000 × 1.035^3			M1 for completing method to find total amount in the account	(M1 for 40 000 × 1.035^2 (= 42 849))
			44 349		A1 accept 44 348 – 44 349	
					SC: if no other marks gained award M1 for 0.105 × 40 000 oe **or** 4200 **or** 44 200 accept (1 + 0.035) as equivalent to 1.035 throughout	
(b)	e.g. 30 481 ÷ (1 – 0.065) **or** 30 481 ÷ 0.935			3	M2 for a complete method (M1) for 30 481 ÷ (100 – 6.5) (= 326) **or** (100 – 6.5)% = 30 481 **or** 93.5% = 30 481 **or** e.g. (1 – 0.065)x = 30 481	
			32 600		A1	
						Total 6 marks

Q	Working	Answer	Mark	Notes	
6	e.g. 0.7 × 20 160 oe (= 14 112) **or** 0.3 × 20 160 oe (= 6048)		4	M1	
	e.g. "14 112" ÷ (9 + 5 + 2) (= 882) **or** (20 160 − "6048") ÷ (9 + 5 + 2) (= 882)			M1	M2 for $\frac{9-2}{9+5+2}$ × "14 112" oe
	e.g. 9 × "882" – 2 × "882"			M1	
		6174		A1	
					Total 4 marks

Q	Working	Answer	Mark	Notes
7	e.g. $\sin 65 = \frac{16}{AB}$ **or** $\cos 25 = \frac{16}{AB}$ **or** $\frac{AB}{\sin 90} = \frac{16}{\sin 65}$ **or** $\tan 65 = \frac{16}{AD}$ **or** $\tan 25 = \frac{AD}{16}$ **or** $\frac{AD}{\sin 25} = \frac{16}{\sin 65}$		4	M1 for a correct trig ratio for *AB* **or** *AD* accept 180 – 90 – 65 for 25
	e.g. $(AB =) \frac{16}{\sin 65} (= 17.654\ldots)$ **or** $(AB =) \frac{16}{\cos 25} (= 17.654\ldots)$ **or** $(AB =) \frac{16 \sin 90}{\sin 65} (= 17.654\ldots)$ **and** $(AD =) \frac{16}{\tan 65} (= 7.460\ldots)$ **or** $(AD) = 16 \times \tan 25 (= 7.460\ldots)$ **or** $(AD =) \frac{16 \sin 25}{\sin 65} (= 7.460\ldots)$			M1 for finding *AB* **and** *AD* Allow use of Pythagoras $(AD =) \sqrt{"17.654..."^2 - 16^2} (= 7.460\ldots)$ or $(AB =) \sqrt{"7.460..."^2 + 16^2} (= 17.654\ldots)$
	("17.654…" × 2) + ("7.460…" × 2) oe			M1 for a complete method to find the perimeter
		50.2		A1 accept 49.6 – 50.6
				Total 4 marks

Q		Working	Answer	Mark	Notes
8		5 × 398 (= 1990) or 6 × 401 (= 2406)		3 M1	Correct total for 5 or for 6 cocoa pods
		"2406" – "1990"		M1	(M2 for 398 + 6 × 3 or 401 + 5 × 3)
			416	A1	
					Total 3 marks

9	(a)			2	M1	for use of cf at 45
			146		A1	accept in the range 145 – 147
	(b)	93.75 ÷ 3.75 (= 25)		3	M1	
		Using cf diagram at 90 – "25" (= 65)			M1	for use of cf at "65"
			151		A1	accept in the range 150 – 152
						Total 5 marks

Q		Working	Answer	Mark	Notes
10		eg $20\times\frac{9a-7}{5}-20\times\frac{3a-7}{4}=20\times4.55\,(=91)$ or eg $4(9a-7)-5(3a-7)=20\times4.55$ or eg $\frac{4(9a-7)}{20}-\frac{5(3a-7)}{20}(=4.55)$ or eg $\frac{4(9a-7)-5(3a-7)}{20}(=4.55)$		3	M1 For clear intention to multiply all terms by 20 (or 4 × 5) or a multiple of 20 oe or to express LHS as two fractions over 20 (or 4 × 5) or a multiple of 20 oe or as a single fraction with a denominator of 20 (or 4 × 5) or a multiple of 20 oe if expanded numerator, allow one error
		eg $36a - 28 - 15a + 35 = 20 \times 4.55$ or $21a = 84$ oe			M1 Expanding brackets and multiplying by denominator with no more than one sign error
			4		A1 dep on M1

11	(a) (i)		62	3	B1
	(a) (ii)		118		B1ft 180 – their (a)(i)
	(b)		62		B1
					Total 3 marks

Q	Working	Answer	Mark	Notes
12	9.55 **or** 9.65 **or** 3.75 **or** 3.85 **or** 1.835 **or** 1.845		3 B1	accept $9.64\dot{9}$ for 9.65, $3.84\dot{9}$ for 3.85, $1.844\dot{9}$ for 1.845
	$a=\frac{UB_v - LB_u}{LB_t}$ e.g. $a=\frac{9.65-3.75}{1.835}(=3.2152...)$		M1	for correct substitution of $9.6 < UB_v \leqslant 9.65$ **and** $3.75 \leqslant LB_u < 3.8$ **and** $1.835 \leqslant LB_t < 1.84$
		3.22	A1	accept 3.21 – 3.22 from correct working
				Total 3 marks

13	$2 \times \pi \times 7$ (= 43.982… or 14π) **or** $(2 \times \pi \times 7) \div 2$ (= 21.991… or 7π) **or** $2 \times \pi \times 9$ (= 56.548… or 18π) **or** $(2 \times \pi \times 9) \div 2$ (= 28.274… or 9π)		3	M1	for finding the circumference of either the full circle or the length of the arc for either semicircle
	e.g. "21.991" + "28.274" (= 50.26…) **or** "7π" + "9π" (=16π) **or** "21.991" + "28.274" + 2 (= 52.26…) **or** "7π" + "9π" + 2 (= 52.26…) **or** "21.991" + "28.274" + 2 + 2 **or** "7π" + "9π" + 2 + 2			M1	for a method to find the length of the two arcs with intention to add
		54.3		A1	accept 54.2 – 54.3
					Total 3 marks

Q		Working	Answer	Mark	Notes
14		eg $\frac{4}{5}\times\frac{3}{7}(=\frac{12}{35})$oe **or** $0.24\times\frac{4}{7}(=\frac{96}{700})$oe **or** eg $\frac{4}{5}\times 3(=\frac{12}{5}=2.4)$ **and** $0.24\times 4(=\frac{24}{25}=0.96)$ (or 3.36) **or** eg $\frac{4}{5}\times 300(=240)$ **and** $0.24\times 400(=96)$ (or 336)		3	M1
		eg $"\frac{12}{35}"+"\frac{96}{700}"\left(=\frac{336}{700}\right)$ oe **or** $\frac{"2.4"+"0.96"}{3+4}\left(=\frac{3.36}{7}\right)$ oe **or** eg $\frac{"240"+"96"}{300+400}\left(=\frac{336}{700}\right)$ oe			M1 or 0.48 or 48% or correct unsimplified fraction eg $\frac{84}{175}$
			$\frac{12}{25}$		A1 cao
					Total 3 marks

Q	Working	Answer	Mark	Notes
15	e.g. $30 \times 20 \times 125$ (= 75 000) **or** $85 \times 40 \times 125$ (= 425 000) **or** $(60\times30+(85-30)\times40)\times125$(= 500 000) oe		4	M1 for a method to find the volume of water already pumped out **or** the volume of water left **or** the total volume of the container
	"75 000" ÷ 1.5 (= 50 000) **or** "75 000" ÷ 90 (= 833.3... or $\frac{2500}{3}$) **or** "425000"÷"75000"(= 5.66... or $\frac{17}{3}$) **or** "500000"÷"75000"(= 6.66... or $\frac{20}{3}$)			M1 M2 for $\frac{\text{"425000"}}{\text{"75000"}} \times 1.5$ oe (= 8.5) **or** $\frac{\text{"500000"}}{\text{"75000"}} \times 1.5$ oe (= 10)
	"425 000" ÷ "50 000" (= 8.5) **or** "425 000" ÷ ("833.3..." × 60) oe (= 8.5) **or** "5.66…" × 1.5 (= 8.5) **or** "6.66…" × 1.5 (= 10)			M1
		20 30		A1 Allow 8 30 (pm)
				Total 4 marks

Q	Working	Answer	Mark	Notes
16	$(BC^2 =)\ 150^2 + 275^2 - (2 \times 150 \times 275 \times \cos 120)\ (= 139\,375)$		5	M1 for correct substitution into the cosine rule
	$(BC =)\ \sqrt{150^2 + 275^2 + 41250}$ oe or $\sqrt{139375}$ or $25\sqrt{223}$ or 373.…			M1 for correct order of operations and square root
	e.g. $\frac{\sin ABC}{275} = \frac{\sin 120}{"373..."}$ **or** $275^2 = 150^2 + "373..."^2 - (2 \times 150 \times "373..." \times \cos ABC)$ **or** $\cos ABC = \frac{150^2 + "373..."^2 - 275^2}{2 \times 150 \times "373..."}$ **or** $\frac{\sin ACB}{150} = \frac{\sin 120}{"373..."}$ **or** $150^2 = 275^2 + "373..."^2 - (2 \times 275 \times "373..." \times \cos ACB)$ **or** $\cos ACB = \frac{275^2 + "373..."^2 - 150^2}{2 \times 275 \times "373..."}$			M1 (dep on 1st M1) ft 373… for a correct trig statement involving angle ABC **or** angle ACB
	$(ABC =) \sin^{-1}\left(\frac{\sin 120}{"373..."} \times 275\right) (= 39.6\ldots)$ **or** $(ABC =) \cos^{-1}\left(\frac{150^2 + "373..."^2 - 275^2}{2 \times 150 \times "373..."}\right) (= 39.6\ldots)$ **or** $(ACB =) \sin^{-1}\left(\frac{\sin 120}{"373..."} \times 150\right) (= 20.3\ldots)$ **or** $(ACB =) \cos^{-1}\left(\frac{275^2 + "373..."^2 - 150^2}{2 \times 275 \times "373..."}\right) (= 20.3\ldots)$			M1 for a complete method to find angle ABC **or** angle ACB
		140		A1 accept 140 – 140.4
				Total 5 marks

Q		Working	Answer	Mark	Notes
17	(a)	63 ÷ 1.5 (= 42) **or** a correct value written on FD scale (10 small squares = FD 10) **or** 10 squares = 1 parcel or 1 big square = 2.5 parcels oe eg area = 18 × 5 + 15 × 42 + 10 × 24 + 10 × 30 + 20 × 8 (= 1420) 3.6 × 1 + 3 × 8.4 + 2 × 4.8 + 2 × 6 + 4 × 1.6 (= 56.8) (at least 3 bars correct for any method of summing area)		3	M1 For use of area related to frequency eg showing a correct unambiguous value on the frequency density scale or calculating the area in some form
		0.5 × 18 + 63 + 1 × 24 + 1 × 30 + 2 × 8 (9 + 63 + 24 + 30 + 16) oe eg "1420" ÷ 10 or "56.8" × 2.5 oe			M1 Total of 5 frequencies with just one error or Area of bars with just one error, with correct calculation to give frequency
			142		A1
	(b)	0.75 × 24 (= 18) + 30 + 16 (= 64) oe Eg "their (a)" – (9 + 63 + 0.25 × 24) (= 64) (ft figures from (a) dep on M1 for (a))		3	M1ft (dep on M1 in (a))if working with small squares they may get eg $\frac{640}{1420}$
		$\frac{"64"}{142}\times\frac{"63"}{141}$ (ft their value of 142 from (a))			M1 64 must come from correct working allow $\frac{"64"}{142}\times\frac{"64"}{142}$ (ft their value of 142 from (a))
			$\frac{672}{3337}$		A1 0.201 or better (0.20137…)
					Total 6 marks

Q	Working	Answer	Mark	Notes
18	$\sqrt[3]{\frac{4352}{1836}}$ **or** $\frac{4}{3}$ **or** 1.33(33...) **or** 4:3 **or** $\sqrt[3]{\frac{1836}{4352}}$ **or** $\frac{3}{4}$ **or** 0.75 **or** 3:4		3	M1 for a correct length scale factor or a correct length ratio
	e.g. $1120 \div \left("\frac{4}{3}"\right)^2$ oe **or** $1120 \times \left("\frac{3}{4}"\right)^2$ oe			M1 (dep on M1) for a correct method to work out the surface area of A
		630		A1
				Total 3 marks

Q		Working		Mark	Notes
19		eg $(AD =)\sqrt{6^2+6^2-2\times6\times6\times\cos(50)}$ (= 5.07…)**or** 2 × 6sin25 (=5.07...) **or** $\frac{6\sin 50}{\sin 65}$(= 5.07...) oe		6	M1 Correct expression for *AD* ie *AD* = … or *x* = oe
		eg 6 + 6 + $\sqrt{6^2+6^2-2\times6\times6\times\cos(50)}$ or 12 +"5.07…" (=17.0)7... or 17.1)			M1 A **correct** statement of perimeter of triangle *OAD*
		eg (arc *BC*=) $\frac{50}{360}\times\pi\times2\times(6+x)$ oe			M1 A correct statement for arc *BC* (condone missing brackets around (6 + *x*) for this mark only)
		eg $2\times"17.1"=12+2x+\frac{50}{360}\times\pi\times2\times(6+x)$ oe			M1 dep on M3 for a correct equation for *x*
		eg $2\times17.1-12-\frac{30}{18}\pi=2x+\frac{5x}{18}\pi$			M1 isolating terms in *x* in a correct equation
			5.89		A1 5.88 – 5.89
					Total 6 marks

Practice Tests Set 16 – Paper 2H-3H mark scheme, performance data and suggested grade boundaries

						Edexcel averages: scores of candidates who achieved grade:								
Qn	**Paper**	**Question**	**Mean score**	**Max score**	**Mean %**	**ALL**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**U**
1	2H	Q08	3.83	5	77	3.83	4.90	4.77	4.59	4.14	3.07	1.33	0.49	0.29
2	1H	Q02	3.98	5	80	3.98	4.92	4.76	4.50	4.09	3.39	2.41	1.42	0.38
3	2H	Q03	4.93	6	82	4.93	5.78	5.44	5.37	5.02	4.48	3.95	2.56	1.05
4	2H	Q01	2.34	3	78	2.34	2.97	2.81	2.60	2.41	1.85	1.40	0.62	0.37
5	1H	Q07	4.37	6	73	4.37	5.79	5.45	5.08	4.26	3.10	2.18	1.29	0.44
6	1H	Q01	2.99	4	75	2.99	3.80	3.67	3.34	2.96	2.52	1.74	0.66	0.36
7	1H	Q10	2.58	4	65	2.58	3.79	3.53	3.21	2.53	1.30	0.38	0.14	0.00
8	2H	Q07	1.89	3	63	1.89	2.92	2.56	2.21	1.55	0.96	0.42	0.24	0.07
9	1H	Q11	3.29	5	66	3.29	4.54	3.98	3.53	3.04	2.31	1.87	1.16	0.65
10	2H	Q14a	1.91	3	64	1.91	2.89	2.61	2.10	1.66	1.06	0.46	0.30	0.03
11	2H	Q13	1.88	3	63	1.88	2.77	2.44	2.01	1.61	1.19	0.83	0.27	0.20
12	1H	Q15	1.77	3	59	1.77	2.92	2.59	1.98	1.36	0.66	0.22	0.11	0.00
13	1H	Q08	1.36	3	45	1.36	2.51	1.84	1.41	0.89	0.40	0.25	0.05	0.00
14	2H	Q10	1.41	3	47	1.41	2.55	1.94	1.39	0.92	0.53	0.29	0.08	0.01
15	1H	Q03	1.63	4	41	1.63	3.01	2.08	1.73	1.09	0.67	0.26	0.05	0.00
16	1H	Q16	2.23	5	45	2.23	4.48	3.53	1.84	1.04	0.41	0.09	0.03	0.08
17	2H	Q15	2.10	6	35	2.10	4.08	3.09	2.09	1.20	0.39	0.14	0.04	0.01
18	1H	Q20	1.24	3	41	1.24	2.70	1.95	0.97	0.40	0.10	0.02	0.00	0.00
19	2H	Q22	1.45	6	24	1.45	3.53	1.89	0.93	0.49	0.18	0.04	0.00	0.00
			47.18	**80**		**47.18**	**70.85**	**60.93**	**50.88**	**40.66**	**28.57**	**18.28**	**9.51**	**3.94**

Suggested grade boundaries

Grade	**9**	**8**	**7**	**6**	**5**	**4**	**3**
Mark	71	66	55	35	23	14	7