Practice Test 2H-3H (Set 10) – Higher tier mark scheme

Question		Working	Answer	Mark	Notes
1	(a)	$\frac{15}{6}$ **or** $\frac{6}{15}$ **or** $\frac{4.2}{6}$ **or** $\frac{6}{4.2}$ oe 2.5 **or** 0.4 **or** 0.7 **or** 1.4(2857……)			M1 for a correct scale factor, accept ratio notation eg 6 : 15
			10.5	2	A1 oe
	(b)	19.5 ÷ 2.5 **or** 19.5 × 0.4 oe **or** $4.2\times\frac{19.5}{(a)}$			M1 If using *DF* ft their answer from part (a)
			7.8	2	A1 oe
					Total 4 marks

Question		Working	Answer	Mark	Notes
2		12 × 8 × 5 (= 480)		3	M1
		"480" × 0.7			M1 Dep on M1
			336		A1
					Total 3 marks

Question		Working	Answer	Mark	Notes
3		95 × 8 + 105 × 12 + 115 × 15 + 125 × 10 + 135 × 3 (= 5400) **or** 760 + 1260 + 1725 + 1250 + 405 (= 5400)			M2 for at least **4** correct products added (need not be evaluated) **or** 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 midpoints used for at least **4** products and not added
		'5400' ÷ '48'			M1 dep on at least M1 Allow division by their Σf provided addition or total under column seen
			112.5	4	A1 oe accept 112 **or** 113 from complete working Accept 112.5 with no working Do not accept 112 **or** 113 with no working
					Total 4 marks

Question		Working		Answer	Mark	Notes
4		e.g. $x + 2y = -0.5$ $+ \ 6x - 2y = \ 32$ $(7x = 31.5)$	e.g. $3x + 6y = -1.5$ $- \ 3x - y \ = \ 16$ $(7y = -17.5)$			M1 for a 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)
		e.g. '4.5' + $2y$ = -0.5 **or** $3 \times$ '4.5' $- y = 16$	e.g. $x + 2 \times$ '-2.5' = -0.5 **or** $3x -$ '-2.5' $= 16$			M1 (dep) for substituting their value found of one variable into one of the equations **or** for repeating above method to find second variable
				$x = 4.5$ $y = -2.5$	3	A1 (dep on first M1) for both solutions
						Total 3 marks

Question		Working	Answer		Mark	Notes
5		0.08 × 170 000 (=13600) **or** 0.92 × 170 000 (=156400)		3	M1 oe eg 170 000 ÷ 12.5	M2 for 170 000 × 0.92^3
		e.g. 0.92 × (0.92 × "156400")			M1 (dep)for a complete method	
			132377		A1 or 132376.96	
					(SCB2 for 170 000 × 0.92^4)(=121786.(810)) (SCB1 for 170 000 × 0.24 (=40 800) **or** 170 000 ×0.76 (=129 200) **or** 170 000 × 1.08 (= 183 600) **or** 170 000 × 1.08^3 (= 214151) **or** an answer of 129 200 **or** an answer of 214 151 – 214151.1(0))	
						Total 3 marks

Question		Working	Answer	Mark	Notes
6	(a)		7, 17, 29, 48, 66, 80	1	B1 cao
	(b)				M1 ft from (a) if only one addition error for at least 4 points plotted correctly at end of interval **or** for all 6 points plotted consistently within each interval in the frequency table at the correct height
			Correct cf graph	2	A1 accept curve or line segments accept curve that is not joined to (0,0)
	(c)		17 − 19	1	B1 ft from a cumulative frequency graph dep on M1 in (b)
	(d)	For correct use 20 and 60 (20.25 and 60.75) indicated (horizontal line or mark) on the cumulative frequency axis and their readings taken from time taken axis e.g. readings of 11−13 and 22−24 indicated on horizontal axis or 23 − 12			M1 for a complete method to ft from a cumulative frequency graph dep on M1 in (b)
			9 – 13	2	A1 accept 9 – 13 ft from a cumulative frequency graph dep on M1 in (b)
					Total 6 marks

Question		Working	Answer	Mark	Notes
7		$17.8^2 + 26.3^2 – 2 \times 17.8 \times 26.3 \times \cos 36$		3	M1
		e.g. 1008.5... – 757…. **or** 251(.06…)			M1 for correct order of operations
			15.8		A1 for ans in range 15.8 – 15.9
					Total 3 marks

Question		Working	Answer	Mark	Notes
8		$(ED =)\dfrac{16.7}{\tan 43}$ (=17.90855...) **or** $(CD =)\dfrac{16.7}{\sin 43}$ (= 24.48686...)			M1 for a correct method to find length *CD* or *ED* (*E* is the point on line *AD* from where a vertical line is drawn downwards from point *C*) NB. Sine rule may be used
		$(ED =)\dfrac{16.7}{\tan 43}$ (=17.90855...) **and** $(CD =)\dfrac{16.7}{\sin 43}$ (= 24.48686...)			M1 for a correct method to find both *CD* **and** *ED* **or** use of Pythagoras theorem $(CD =)\sqrt{16.7^2 + '17.90....'^2}$ (= 24.48686...) $(ED =)\sqrt{'24.48....'^2 – 16.7^2}$ (=17.90855...) NB. Sine rule must be in the correct form to give the answer
		16.7 + 21.2 × 2 + '24.5' + '17.9' (= 101.495...)			M1 (dep on M2) complete method with no extra sides
			101	4	A1 accept 101 – 102
					Total 4 marks

Question		Working	Answer	Mark	Notes
9		e.g. 30 × 26.8 (= 804) **or** 13 × 25 (= 325) **or** (26.8 – 25) × 30 **or** 1.8 × 30			M1 for finding the total marks for the boys or the total test marks
		e.g. (30 × 26.8 − 13 × 25) ÷ (30 – 13) (= 28.1764...) **or** ('804' – '325') ÷ (30 – 13) (= 28.1764...) **or** ('804' – '325' ÷ 17) (= 28.1764...) **or** ((26.8 – 25) × 30) ÷ 17 + 25 (= 28.1764...) **or** '1.8' × 30 ÷ 17 + 25 (= 28.1764...)			M1 for a complete method to find the mean mark for the girls
			28.2	3	A1 accept 28.15 – 28.2 (accept without working) (Accept 28 from complete working)
					Total 3 marks

Practice Test 2H-3H (Set 10) – Higher tier mark scheme

Question		Working	Answer	Mark	Notes
10	(a)	eg $\frac{24}{36}$ or 2 : 3 oe **or** $\frac{36}{24}$ or 3 : 2 oe		2	M1 for a correct scale factor
			2160		A1
	(b)	$\left(\frac{24}{36}\right)^3$ or $2^3 : 3^3$ oe **or** $\left(\frac{36}{24}\right)^3$ or $3^3 : 2^3$ oe or $\frac{8}{27}$ or $\frac{27}{8}$ oe		2	M1 For correct SF for volume ft from linear scale factor in (a) or ft from $\sqrt{\frac{"2160"}{960}}$
			(**A** =) $\frac{8}{27}V$ oe		A1 oe eg $\frac{V}{3.375}$
					Total 4 marks

Practice Test 2H-3H (Set 10) – Higher tier mark scheme

Question		Working	Answer	Mark	Notes	
11	(a)	15 km/h or $\frac{25}{6}$ m/sec or 0.25 km/min or $\frac{15}{4}$ oe 12 km/h or $\frac{10}{3}$ m/sec or 0.2 km/min or $\frac{9}{3}$ oe	'before' with reason	1	B1	e.g. before as gradient is steeper **or** before as speed before is 15 km/h speed after is 12 km/h **or** before as she goes over 11(allow 11-12) km in ¾ hour but only goes 9 km in ¾ hour after oe NB: any figures used for the reason must be accurate if they haven't used 'gradient is steeper' oe
	(b)		line from (12:00, 24) to (12:45, 24) to (14:15, 0)	2	B2	If not B2 then B1 for a line from (12:00, 24) to (12:45, 24) **or** for a line from (t, 24) to (t + 1.5, 0) **or** for a time of 1.5 hours (oe) seen
	(c)	1h 45m + 1h 30m **or** 1 + 0.75 + 1.5 **or** 3h 15m **or** 3.25h **or** 195m oe		3	M1	ft from their graph for total time when cycling
		(24 × 2) ÷ "3.25" oe eg (48 ÷ 195) × 60			M1	ft dep on M1 for full method
			14.8		A1	awrt 14.8
						Total 6 marks

Question		Working	Answer	Mark	Notes
12		(x) × 1000 **or** (x) ÷ 60 **or** (x) ÷ 60 ÷ 60 **or** (x) × 1000 ÷ 60 oe			M1 for at least **one** of × 1000 **or** ÷ 60 **or** $\frac{5}{18}$ oe
		$x \times \frac{1000}{60 \times 60}$ oe			M1 (dep) for a complete correct method
			$\frac{5}{18}x$	3	A1 accept $0.27\dot{x}$ **or** $0.27\bar{x}$ **or** $\frac{x}{3.6}$ **or** $\frac{1}{3.6}x$
					Total 3 marks

Question		Working	Answer	Mark	Notes
13		e.g. $(AC =) \sqrt{(4x)^2 + (2x)^2}$ $(= \sqrt{20}x)$ **or** $(AC =) \sqrt{(4)^2 + (2)^2}$ $(= \sqrt{20})$ **or** $(AF =) \sqrt{(4)^2 + (2)^2 + (3)^2}$ $(= \sqrt{29})$ **or** $(AF =) \sqrt{(\sqrt{20})^2 + (3)^2}$ $(= \sqrt{29})$ **or**			M1 for a method to find an expression for length AC or length AF with or without x **or** x can represent any number e.g. $AB : BC : CF = 2 : 1 : 1.5$ $AC^2 = \sqrt{2^2 + 1^2}$ $\left(= \sqrt{5}\right)$
		e.g. $(CAF =) \tan^{-1}\left(\frac{3x}{'\sqrt{20x}'}\right)$ (= 33.854...) or $(CAF =) \tan^{-1}\left(\frac{3}{'\sqrt{20}'}\right)$ (= 33.854...) or $(CAF =) \cos^{-1}\left(\frac{'\sqrt{20}'}{'\sqrt{29}'}\right)$ (= 33.854...) or $(CAF =) \sin^{-1}\left(\frac{3}{'\sqrt{29}'}\right)$ (= 33.854...)			M1 for a complete method to find angle CAF using length AC **or** for a complete method to find angle CAF using length AF with or without x or x can represent any number $AB : BC : CF = 2 : 1 : 1.5$ $(CAF =) \tan^{-1}\left(\frac{1.5}{'\sqrt{5}'}\right)$ (= 33.854...)
			33.9°	3	A1 answers in the range 33.85 – 33.9
					Total 3 marks

Question		Working	Answer	Mark	Notes
14		$250 = 0.5 \times 26 \times AC \times \sin(39)$ oe			M1 for using the area formula correctly If this mark is awarded then ft on the remaining M marks
		(AC=) 30.5(5579...) or 30.6			A1
		$\frac{(AB)}{\sin 47} = \frac{'30.56'}{\sin 95}$ oe **or** $\frac{(BC)}{\sin(180-95-47)} = \frac{'30.56'}{\sin 95}$ oe			M1 dep on M1 for correct substitution into sine rule
		$(AB =) \frac{'30.56'}{\sin 95} \times \sin 47$ (= 22.4(3407...)) **or** $(BC =) \frac{'30.56'}{\sin 95} \times \sin(180-95-47)$ (= 18.8(8524...))			M1 (dep on previous M marks) for a correct method to find a missing length **or** sight of values in the ranges 22.39 – 22.47 for AB 18.8 – 18.92 for BC
		250 + 0.5 × '30.56' × '22.43' × sin(180 – 95 – 47) (= 461.03....) **or** 250 + 0.5 × '30.56' × '18.88' × sin(47) (= 461.03....)			M1 for a complete method to find total area
			461	6	A1 accept 461 - 462
					Total 6 marks

Question		Working	Answer	Mark	Notes	
15	(a)	$y = kx^3$ **or** $ky = x^3$			M1 (NB. Not for $y = x^3$) Constant of proportionality must be a symbol such as k	M2 for $20h = k \times h^3$ oe
		$20h = k \times h^3$ oe			M1 substitution of x and y into a correct formula	
			$y = \frac{20x^3}{h^2}$	3	A1 for $y = \frac{20x^3}{h^2}$ oe Award 3 marks if answer is $y = kx^3$ and $k = \frac{20}{h^2}$ oe is seen in part (a) or in part (b)	
	(b)	$\sqrt[3]{67.5h \div '\frac{20}{h^2}'}$ oe			M1 ft, dep on at least M1 in part (a), complete method to find x	
			$1.5h$	2	A1 accept $\frac{3}{2}h$ or $\frac{3h}{2}$	
						Total 5 marks

Practice Test 2H-3H (Set 10) – Higher tier mark scheme

Question		Working	Answer	Mark	Notes
16		$h = 3r$ or $r = \frac{h}{3}$		5	M1 for $h = 3r$ **or** $r = \frac{h}{3}$ oe stated or used correctly
		$\frac{1}{2} \times \frac{4}{3} \times \pi r^3$ oe **or** $\pi \times r^2 \times 3r$ oe			M1 **or** $\frac{1}{2} \times \frac{4}{3} \pi \left(\frac{h}{3}\right)^3$ or $\pi \left(\frac{h}{3}\right)^2 h$
		$\frac{1}{2} \times \frac{4}{3} \times \pi r^3 + \pi \times r^2 \times 3r = 792\pi$ oe			M1 **or** $\frac{1}{2} \times \frac{4}{3} \pi \left(\frac{h}{3}\right)^3 + \pi \left(\frac{h}{3}\right)^2 h = 792\pi$
		$(r =)$ 6 or $(h =)$ 18			A1
			24		A1ft their "6" × 4 **or** "18" × $\frac{4}{3}$ correctly evaluated dep on M3
					Total 5 marks

Question		Working		Answer	Mark	Notes
17		angle *ABD* = 71 **or** angle *ACD* = 71 **or** using *O* as centre of circle, angle *ADO* = 90 – 71 (=19)		5	M1	clearly labelled or stated
		angle *ADB* = 71 **or** angle *ACB* = 71 **or** angle *BAD* = 19 × 2 (=38) **or** reflex angle *BOD* = 2 × 142 (=284)			M1	dep clearly labelled or stated
		angle *BCD* = 142	142		A1	Clearly labelled or stated, from no incorrect working for their method
					B2	dep on A1 for fully correct reasons for each stage of working, repeated if used more than once. eg alternate segment theorem, base angles in an isosceles triangle are equal, angles in a triangle sum to 180°, angle between tangent and radius(diameter) is 90° congruent triangles (equal triangles) oe opposite angles of a cyclic quadrilateral sum to 180° angles in the same segment angle at the centre is 2 × angle at circumference oe equal chords subtend equal angles at the circumference If not B2 then award B1 dep on M1 for any one correct circle theorem reason associated with angle(s) found
						Total 5 marks

Question		Working		Answer	Mark	Notes
18		$x^2 - 3x(9 - x) + 2(9 - x)^2$ (= 0)	$(9 - y)^2 - 3y(9 - y) + 2y^2$ (= 0)			M1 substitution of linear equation into quadratic
		e.g. $6x^2 - 63x + 162$ (= 0) **or** $2x^2 - 21x + 54$ (= 0) allow $2x^2 - 21x = -54$ oe	e.g. $6y^2 - 45y + 81$ (= 0) **or** $2y^2 - 15y + 27$ (= 0) allow $2y^2 - 15y = -27$ oe			A1 (dep on M1) writing the correct quadratic expression in form $ax^2 + bx + c$ (= 0) allow $ax^2 + bx = c$
		e.g. $(2x - 9)(x - 6)$ (= 0) $x = \frac{-(-21) \pm \sqrt{(-21)^2 - 4}}{2 \times 2}$ e.g. $2\left(\left(x - \frac{21}{4}\right)^2 - \left(\frac{21}{4}\right)^2\right) = -54$	e.g. $(2y - 9)(y - 3)$ (= 0) $y = \frac{-(-15) \pm \sqrt{(-15)^2 -}}{2 \times 2}$ e.g. $2\left(\left(x - \frac{15}{4}\right)^2 - \left(\frac{15}{4}\right)^2\right) = -27$			M1 (dep on M1) for a complete method to solve their 3-term quadratic equation (allow one sign error and some simplification – allow as far as $\frac{21 \pm \sqrt{441 - 432}}{4}$)
		$x = 4.5$ and $x = 6$	$y = 4.5$ and $y = 3$			A1 (dep on M1) both x-values **or** both y-values
				(4.5, 4.5) and (6, 3)	5	A1 (dep on M1) oe Must be paired correctly
						Total 5 marks

Question		Working	Answer	Mark	Notes
19					
		$\frac{3}{t}\times\frac{t-3}{t-1}$ **or** $\frac{t-3}{t}\times\frac{3}{t-1}$	$\frac{3}{t}\times\frac{2}{t-1}$ **or** $\frac{t-3}{t}\times\frac{t-4}{t-1}$		M1 for one correct product
		$\frac{3}{t}\times\frac{t-3}{t-1}+\frac{t-3}{t}\times\frac{3}{t-1}=\frac{12}{35}$ **or** $2\times\frac{3}{t}\times\frac{t-3}{t-1}=\frac{12}{35}$ oe	$\frac{3}{t}\times\frac{2}{t-1}+\frac{t-3}{t}\times\frac{t-4}{t-1}=\frac{23}{35}$		M1 dep on M1 for a correct equation
		e.g. $2t^2 - 37t + 105 (= 0)$ **or** allow $2t^2 - 37t = -105$			A1 (dep on M2) writing the correct quadratic expression in form $ax^2 + bx + c$ (= 0) allow $ax^2 + bx = c$
		e.g. $(2t - 7)(t - 15) = 0$ e.g. $t = \frac{-(-37) \pm \sqrt{(-37)^2 - 4\times 2\times 105}}{2\times 2}$ e.g. $2\left(\left(t-\frac{37}{4}\right)^2-\left(\frac{37}{4}\right)^2\right)=-105$			M1 (dep on A1) for a complete method to solve the 3-term quadratic equation (allow one sign error and some simplification – allow as far as $\frac{37\pm\sqrt{1369-840}}{4}$) **or** Can be implied by answers of 15 (and $\frac{7}{2}$)
			12	5	A1 (dep on A1) cao
					Total 5 marks

Practice Test 2H-3H (Set 10) – Higher tier mark scheme

Performance data for Practice Test 2H-3H (Set 10)

				Edexcel averages: scores of candidates who achieved grade:							
Qn	**Mean score**	**Max score**	**Mean %**	**ALL**	**9**	**8**	**7**	**6**	**5**	**4**	**3**
Q01	3.62	4	91	3.62	3.98	3.97	3.93	3.83	3.50	2.58	1.42
Q02	2.57	3	86	2.57	2.98	2.93	2.80	2.56	2.19	1.61	1.07
Q03	3.35	4	84	3.35	3.93	3.81	3.62	3.29	2.89	2.18	1.39
Q04	2.46	3	82	2.46	2.94	2.85	2.69	2.42	2.00	1.46	0.93
Q05	2.44	3	81	2.44	2.91	2.75	2.58	2.34	2.07	1.64	1.18
Q06	4.79	6	80	4.79	5.70	5.48	5.18	4.68	3.94	3.06	2.19
Q07	2.15	3	72	2.15	2.91	2.73	2.42	1.94	1.27	0.66	0.30
Q08	2.70	4	68	2.70	3.77	3.50	3.02	2.34	1.50	0.71	0.20
Q09	1.90	3	63	1.90	2.86	2.54	2.04	1.46	0.90	0.49	0.22
Q10	2.46	4	62	2.46	3.81	3.28	2.47	1.76	1.19	0.79	0.50
Q11	3.08	6	51	3.08	4.60	3.54	3.01	2.56	2.14	1.57	1.06
Q12	1.43	3	48	1.43	2.41	1.79	1.33	0.99	0.72	0.49	0.35
Q13	1.38	3	46	1.38	2.58	1.99	1.28	0.71	0.31	0.11	0.04
Q14	2.70	6	45	2.70	5.30	4.13	2.47	1.03	0.36	0.10	0.01
Q15	1.74	5	35	1.74	3.26	2.28	1.62	1.02	0.59	0.28	0.12
Q16	1.57	5	31	1.57	3.57	1.99	1.17	0.64	0.32	0.12	0.05
Q17	1.22	5	24	1.22	3.42	1.47	0.58	0.21	0.09	0.05	0.02
Q18	1.17	5	23	1.17	3.24	1.30	0.56	0.31	0.17	0.09	0.06
Q19	0.56	5	11	0.56	2.16	0.33	0.06	0.01	0.00	0.00	0.00
	43.29	**80**	**54**	**43.29**	**66.33**	**52.66**	**42.83**	**34.10**	**26.15**	**17.99**	**11.11**

Suggested grade boundaries

1MA1 Practice Tests (Set 10)			**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
1H	Higher tier	Paper 1H	63	52	43	35	27	20	17		
2H/3H	Higher tier	Paper 2H/3H	60	47	38	30	22	15	11		
Total	**Higher tier**		**123**	**99**	**81**	**65**	**49**	**35**	**28**		

(Marks for papers 1H, 2H/3H are each out of 80.)