Practice Test 1H (Set 11) – Higher tier mark scheme

Question	Working	Answer		Mark	Notes
1 (a)		w^{12}	1	B1	
(b)		t^6	1	B1	

Question	Working	Answer	Mark	Notes
2	e.g. $4x - 8x = 17 + 13$ oe		2	M1 For collecting terms in x and number terms on either side of a correct equation
		-7.5		A1 oe e.g. $-\frac{30}{4}$
				Total 2 marks

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Question		Working	Answer	Mark	Notes	
3		$\frac{17}{3(-)11}{4}$ or $\frac{5\frac{8}{12(-)2}9}{12}$ $\frac{68}{12}-\frac{33}{12}$ or $4\frac{20}{12}-2\frac{9}{12}$ $\frac{35}{12}=2\frac{11}{12}$		3	M1 M1 A1	Sight of $\frac{17}{3}$ and $\frac{11}{4}$ or $5\frac{8}{12}$ and $2\frac{9}{12}$ or $\frac{68n}{12n}-\frac{33n}{12n}$ Dep on M2
		Alt: $3(+)\left(\frac{2}{3}-\frac{3}{4}\right)$ $3(+)\left(\frac{8}{12}-\frac{9}{12}\right)$ $3-\frac{1}{12}=2\frac{11}{12}$			M1 M1 A1	Dep on M2
		Alt: $4\frac{5}{3}(-)2\frac{3}{4}$ $2(+)\left(\frac{5}{3}-\frac{3}{4}\right)$ $2(+)\left(\frac{20}{12}-\frac{9}{12}\right)$ $=2\frac{11}{12}$			M1 M1 A1	Dep on M2 Dep on M2
						Total 3 marks

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Question		Working	Answer	Mark	Notes	
4		x^9y^6	x^9y^6	2	B1B1	Allow B1 if $(x^3y^2)^3$ or $(x^{36}y^{24})^{0.25}$ seen on answer line
						Total 2 marks

Question		Working	Answer	Mark	Notes
5	(i)		12, 18	1	B1
	(ii)		12, 14, 15, 16, 18, 20	1	B1
					Total 2 marks

Question		Working	Answer	Mark	Notes	
6	(a)		–5, 5, 5, –5	2	B2	All 4 correct values If not B2 then B1 for 2 or 3 correct values
	(b)		Fully correct curve	2	M1 A1	Plotting at least 6 points correctly from their table dep on B1 in part(a) Do not accept horizontal line at top of curve or straight line segments
						Total 4 marks

Question	Working	Answer	Mark	Notes
7		$125x^3y^6$	2	B2 (B1) for 2 correct terms as part of a product
				Total 4 marks

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Question	Working	Answer	Mark	Notes
8 (a)	$(x + 2)(2x + 3) = 2x^2 + 3x + 4x + 6$ $(2x + 3)(x – 7) = 2x^2 − 14x + 3x – 21$ $(x + 2)(x – 7) = x^2 − 7x + 2x − 14$		3	M1 For multiplying a pair of brackets and getting 3 out of 4 terms correct.
	$(2x^2+7x+6)(x–7) = 2x^3−14x^2+7x^2−49x+6x−42$ $(2x^2−11x−21)(x+2) = 2x^3+4x^2−11x^2−22x−21x−42$ $(x^2−5x−14)(2x+3) = 2x^3+3x^2−10x^2−15x−28x−42$			M1dep For multiplying the product of the first 2 brackets (ft from the 1st stage) by the 3rd bracket, and getting at least 3 out of 6 or 4 out of 8 terms correct
		$2x^3 − 7x^2 − 43x − 42$		A1 Fully correct. isw extra work as long as correct e.g. $x(2x2 − 7x − 43) – 42$
	Alternative (all in one method)			
	$(x + 2)(2x + 3)(x − 7) =$ $2x^3 − 14x^2 + 3x^2 − 21x + 4x^2 − 28x + 6x − 42$			M2 For at least 6 out of 8 correct terms (M1) for 4 or 5 out of 8 correct terms
		$2x^3 − 7x^2 − 43x − 42$		A1 Total 3 marks

Question		Working	Answer	Mark	Notes	
9		Gradient = (−)4 ÷ 2 oe	$y = − 2x – 1$ oe	3	M1 A2	Correct method to work out the gradient (±) accept 4 ÷ 2 oe or "m" = 2 If not A2 then A1 for $L = − 2x – 1$ or $− 2x – 1$ or $y = 2x – 1$ or $y = – 2x + c$
						Total 3 marks

Practice Test 1H (Set 11) – Higher tier mark scheme

Question		Working	Answer	Mark	Notes	
10	(a)	Plotting points from table at ends of interval (40, 6), (50, 20), (60, 56), (70, 84), (80,95), (90, 100) Points joined with curve or line segments	 Correct cf diagram	2	M1 A1	$\pm 1/2$ sq (at least 5 points plotted correctly) Or <u>all</u> points plotted consistently within each interval at the correct heights Accept cf graph which is not joined to (30,0)
	(b)	Use of graph at 50	58 – 59	2	M1 A1	Use of graph at 50 walkers No working shown and answer is within 58 – 59 award M1A1
	(c)	86 or 87 or 88 indicated on graph or stated 100 – "86" or 100 – "87" or 100 – "88"	 $\frac{12}{100}$ oe $\frac{13}{100}$ oe $\frac{14}{100}$	3	M1 M1 A1	Use of their graph at 72 minutes Dep e.g. 12, 13 or 14 walkers 0.12 → 0.14 inc, oe
						Total 7 marks

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Question	Working	Answer	Mark	Notes
11 (a)	e.g. one correct value on the vertical scale e.g. 1 at 1 cm high **or** 1 cm^2 = 5 passengers **or** 5 small squares = 1 passenger **or** (FD =) 24 ÷ 20 (= 1.2)		3	M1 For a correct scale on the vertical axis **or** a 1 cm × 1 cm square = 5 passengers **or** other correct scale **or** one correct product or frequency (other than the 24) **or** (FD =) 24 ÷ 20 (= 1.2)
	10×0.4 (= 4) 10×1.8 (= 18) 5×6.4 (= 32) 15×2 (= 30) 20×0.8 (= 16)			M1 At least 3 correct products or frequencies (other than the 24) stated (could be seen on diagram)
		124		A1
(b)	e.g. 0.25 × 24 + 20 × 0.8 (= 22) **or** "1.2" × 5 + 20 × 0.8 (= 22)		2	M1 ft from (a)
		$\frac{"22"}{"124"}$		A1ft oe (0.17(741...))
				Total 5 marks

Practice Test 1H (Set 11) – Higher tier mark scheme

Question	Working	Answer	Mark	Notes
12	$2x^2 + 3(2x + 1)^2 = 5$		5	M1 $2\left(\frac{y-1}{2}\right)^2 + 3y^2 = 5$
	eg $14x^2 + 12x - 2 = 0$ or if completing the square, allow $14x^2 + 12x = 2$ oe			A1 $7y^2 - 2y - 9 = 0$ or if completing the square, allow $7y^2 - 2y = 9$ oe
	eg $(7x - 1)(x + 1)$ or $(7x - 1)(2x + 2)$ eg $\frac{-12 \pm \sqrt{12^2 - 4 \times 14 \times -2}}{2 \times 14}$ oe eg $7\left(\left(x + \frac{3}{7}\right)^2 - \frac{9}{49}\right) = 2$ oe			M1 ft as long as M1 awarded and 3 term quadratic eg $(7y - 9)(y + 1)$ eg $\frac{2 \pm \sqrt{(-2)^2 - 4 \times 7 \times -9}}{2 \times 7}$ oe eg $7\left(\left(y - \frac{1}{7}\right)^2 - \frac{1}{49}\right) = 9$ oe
	$x = \frac{1}{7}, x = -1$ (need both)			A1 $y = \frac{9}{7}, y = -1$ (need both)
		$x = \frac{1}{7}$, $y = \frac{9}{7}$		A1 Dep on M1 Must be paired correctly Must be 3 sf or better (0.142857...) (1.28571...)
		$x = -1$, $y = -1$		
				Total 5 marks

Practice Test 1H (Set 11) – Higher tier mark scheme

Question	Working	Answer	Mark	Notes
13	e.g. $p^2(2m-y)=x+m$ $2p^2m-p^2y=x+m$ $2p^2m-m=x+p^2y$ $m(2p^2-1)=x+p^2y$		3	M1 Multiplying by denominator and expanding bracket
				M1 Collect terms in m and factorise in a correct equation
		$m=\frac{x+p^2y}{2p^2-1}$		A1 oe eg $m=\frac{-x-p^2y}{1-2p^2}$ must have m=
				Total 3 marks

Question	Working	Answer	Mark	Notes
14	(Gradient of $\mathbf{L_1}$ =) 6 ÷ 2 (=3)		4	M1 could be seen as part of an equation. Ignore constant term if candidate rearranges $\mathbf{L_1}$
	$m \times$ "3" $= -1$ **or** $m=-\frac{1}{"3"}$			M1 for use of $m_1m_2 = -1$ could be seen as part of an equation
	$-1="-\frac{1}{3}"\times 9+c$ **or** $y--1="-\frac{1}{3}"(x-9)$ **or** $c=2$			M1
		$y+\frac{1}{3}x=2$		A1 oe in required form eg $3y + x = 6$, $6y + 2x = 12$ etc
				Total 4 marks

Question		Working	Answer	Mark	Notes
15	(i)		(9, 3)	1	B1
	(ii)		(4, 9)	1	B1

Question		Working	Answer	Mark	Notes	
16	(a)		$\frac{3}{4}$ oe	1	B1	
	(b)	$\frac{x-5}{4(x-5)-3}$	$\frac{x-5}{4x-23}$	2	M1 A1	cao
	(c)	$y=\frac{x}{4x-3}$ or $x=\frac{y}{4y-3}$ $y(4x-3)=x$ or $x(4y-3)=y$ $4xy-3y=x$ or $4xy-3x=y$ $4xy-x=3y$ or $4xy-y=3x$ $x(4y-1)=3y$ or $y(4x-1)=3x$	$\frac{3x}{4x-1}$ oe	3	M1 M1 A1	Moving the denominator to the other side of the equation Factorising the variable on one side in a correct expression
	(d)	Tangent drawn at $x = -0.5$ (G =) 18 ÷ 3 oe	$5 \rightarrow 7$	3	M1 M1 A1	Drawing a tangent at $x = -0.5$ Correct method to work out the gradient of the tangent at $x = -0.5$ or $x = +0.5$ Dep on 1st M1 **SC B1 B1 for drawing a tangent at x =+0.5 and gradient = − 3 → −4**
						Total 9 marks

Question		Working	Answer	Mark	Notes	
17		$3^n=\frac{3^x}{3^{2y}}$	$n = x - 2y$	2	M1 A1	for a correct first step e.g. 3^{2y} or 3^{-2y}
						Total 2 marks

Question	Working	Answer	Mark	Notes
18	$\frac{x-4}{x} \times \frac{x-5}{x-1} = 0.7$ 3x2 – 83x + 200 (= 0) oe $\frac{83 \pm \sqrt{83^2 - (4 \times 3 \times 200)}}{2 \times 3}$ or (3x – 8)(x – 25) (=0) or (x – 83/6)2 + 200/3 – 832/36 (=0)	*25*	5	M2 If not M2 then M1 for either $\frac{x-4}{x}$ or $\frac{x-5}{x-1}$ A1 M1 Rearrangement of their quadratic to the form $ax^2 + bx + c (= 0)$ 1st step in solving the correct 3 term quadratic A1 Accept 25 only (dep on M3 if using algebra)
	Alt: y = yellow marbles $\frac{y}{y+4} \times \frac{y-1}{y+3} = 0.7$ 3y2 – 59y − 84 (= 0) oe $\frac{59 \pm \sqrt{59^2 - (4 \times 3 \times -84)}}{2 \times 3}$ or (3y + 4)(y – 21) or (y – 59/6)2 − 84/3 − 592/36 (=0) y = 21 21+4	*25*		M2 If not M2 then M1 for either $\frac{y}{y+4}$ or $\frac{y-1}{y+3}$ A1 M1 Rearrangement of their quadratic to the form $ay^2 + by + c (= 0)$ 1st step in solving the correct 3 term quadratic A1 Accept 25 only (dep on M3 if using algebra) Give full marks if $\frac{21}{25} \times \frac{20}{24} = 0.7$ seen and 1st M2 scored NB: SC B1 for completing 1st step in solving incorrect 3 term quadratic
				Total 5 marks

Question		Working	Answer	Mark	Notes	
19		$-2(x^2-6x)+5$ or $-2[(x)^2-6x-2.5)]$		4	M1	Factorising by extracting -2 in a correct expression
		$-2[(x-3)^2-9-2.5]$ or $-2[(x-3)^2-9]+5$			M1	Correct expression equivalent to $5+12x-2x^2$
		$[-2[(x-3)]^2-11.5]$ or $-2(x-3)^2+18+5$			M1	Correct expression equivalent to $5+12x-2x^2$
			$23-2(x-3)^2$		A1	**Award full marks if a, b, and c are correctly stated and $23-2(x-3)^2$ is not stated anywhere.** SC B3 for $23-2(3-x)^2$ SC B2 for $-2(x-3)^2$ + constant or $23-2(x+\text{constant})^2$ SC B1 for $-2(x+3)^2$ +constant
		Alt: $a+b(x^2+2cx+c^2)$			M1	Multiplying out expression correctly
		$2bc=12$ or $a+bc^2=5$ or $b=-2$			M1	
		$2\times-2\times c=12$ or $c=-3$			M1	Equating coefficients or stating value of b
		$a+-2\times(-3)^2=5$ or $a=23$ seen			M1	Method to calculate c
			$23-2(x-3)^2$			Method to calculate a SC B3 for $23-2(3-x)^2$
						Total 4 marks

Question	Working	Answer	Mark	Notes
20		$a = -2$, $b = 3$	2	B2 **or** $a = 2$, $b = -3$ (B1) for $a = -2$ **or** $a = 2$ **or** $b = 3$ **or** $b = -3$
				Total 4 marks

Question		Working	Answer	Mark	Notes	
21		(Term n =) $\frac{1}{2}n(n+1)$ or (Term n +1 =) $\frac{1}{2(n+1)(n+2)}$ $\frac{1}{2}n(n+1)+\frac{1}{2}(n+1)(n+2)$ $\frac{1}{2}(n+1)(n+n+2) = \frac{1}{2}(n+1)(2n+2)$ or $\frac{1}{2}n^2+\frac{1}{2}n+\frac{1}{2}n^2+\frac{1}{2}n+n+1$ → $n^2 + 2n + 1$	$(n+1)^2$ shown	4	M1 M1 M1 A1	Algebraic representation of one of the two consecutive terms in sequence Adding two consecutive terms Factorisation or multiplying out correctly to get to $n^2 + 2n + 1$ Dep on M3
						Total 4 marks

Question	Working	Answer	Mark	Notes
22	$\overrightarrow{AP} = \frac{3}{4} \times 2\mathbf{c}$ $(= \frac{3}{2}\mathbf{c})$ oe		5	M1 For $\overrightarrow{AP} = \frac{3}{2}\mathbf{c}$ oe, eg could be part of $\overrightarrow{OP} = \mathbf{a} + \frac{3}{2}\mathbf{c}$ oe or on diagram
	$\overrightarrow{AC} = \mathbf{c} - \mathbf{a}$ oe **or** $\overrightarrow{CA} = \mathbf{a} - \mathbf{c}$ oe			M1
	$\overrightarrow{OQ} = \mathbf{c} + n(\mathbf{a} - \mathbf{c})$ **or** $\overrightarrow{OQ} = \mathbf{a} + n(\mathbf{c} - \mathbf{a})$ **or** $\overrightarrow{QP} = n(\mathbf{a} - \mathbf{c}) + \frac{3}{2}\mathbf{c}$			M1
	$\frac{n}{1-n} = \frac{2}{3} \Rightarrow n = \frac{2}{5}$ oe **or** $\frac{1-n}{n} = \frac{2}{3} \Rightarrow n = \frac{3}{5}$ oe **or** $\frac{n}{\frac{3}{2}-n} = \frac{2}{3} \Rightarrow n = \frac{3}{5}$ oe			M1
		3 : 2		A1 oe, dep on M3
				Total 5 marks

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Performance data for Practice Test 1H (Set 11)

New Qn	Mean score	Max score	Mean %	Edexcel averages: scores of candidates who achieved grade: ALL	9	8	7	6	5	4	3
1	0.97	1	97	0.97	1.00	0.99	0.98	0.98	0.96	0.94	0.83
	0.96	1	96	0.96	1.00	0.99	0.99	0.97	0.97	0.92	0.83
2	1.79	2	90	1.79	1.94	1.90	1.88	1.82	1.74	1.41	1.20
3	2.68	3	89	2.68	2.95	2.90	2.84	2.78	2.46	1.99	1.49
4	1.74	2	87	1.74	1.98	1.94	1.80	1.66	1.50	1.29	0.99
5	0.81	1	81	0.81	0.96	0.90	0.85	0.76	0.67	0.54	0.36
	0.73	1	73	0.73	0.95	0.87	0.78	0.66	0.52	0.32	0.20
6	1.85	2	93	1.85	1.99	1.94	1.89	1.82	1.74	1.66	1.48
	1.59	2	80	1.59	1.86	1.73	1.62	1.48	1.37	1.22	1.03
7	1.57	2	79	1.57	1.97	1.86	1.68	1.46	1.11	0.84	0.66
8	2.29	3	76	2.29	2.89	2.70	2.44	2.13	1.73	1.16	0.62
9	2.08	3	69	2.08	2.92	2.70	2.29	1.72	1.04	0.41	0.17
10	1.65	2	83	1.65	1.90	1.82	1.75	1.60	1.36	1.14	1.03
	1.34	2	67	1.34	1.84	1.68	1.42	1.16	0.75	0.45	0.19
	1.91	3	64	1.91	2.67	2.37	2.04	1.63	1.06	0.60	0.20
11	1.93	3	64	1.93	2.77	2.48	2.05	1.52	1.01	0.51	0.36
	1.12	2	56	1.12	1.73	1.47	1.17	0.83	0.47	0.23	0.07
12	2.83	5	57	2.83	4.66	3.91	2.78	1.70	1.02	0.43	0.29
13	1.54	3	51	1.54	2.82	2.22	1.37	0.71	0.37	0.13	0.05
14	1.80	4	45	1.80	3.57	2.69	1.38	0.64	0.25	0.07	0.01
15	0.45	1	45	0.45	0.87	0.65	0.38	0.20	0.08	0.03	0.02
	0.43	1	43	0.43	0.84	0.59	0.34	0.19	0.09	0.03	0.04
16	0.45	1	45	0.45	0.76	0.68	0.44	0.22	0.12	0.03	0.01
	1.33	2	67	1.33	1.91	1.75	1.46	1.03	0.66	0.24	0.19
	1.54	3	51	1.54	2.83	2.25	1.39	0.70	0.26	0.05	0.02
	0.98	3	33	0.98	2.17	1.30	0.67	0.32	0.13	0.03	0.00
17	0.74	2	37	0.74	1.68	1.01	0.45	0.19	0.07	0.02	0.01
18	1.68	5	34	1.68	4.44	2.21	0.63	0.19	0.03	0.00	0.00
19	1.31	4	33	1.31	3.33	1.69	0.59	0.22	0.07	0.03	0.01
20	0.57	2	28	0.57	1.19	0.69	0.39	0.27	0.14	0.11	0.05

21	0.98	4	25	0.98	2.74	1.08	0.32	0.16	0.05	0.04	0.00
22	1.06	5	21	1.06	2.06	1.40	0.92	0.50	0.23	0.07	0.03
	44.70	**80**	**59**	**44.70**	**69.19**	**55.36**	**41.98**	**32.22**	**24.03**	**16.94**	**12.44**

Suggested grade boundaries

1MA1 Practice Tests (Set 10)			**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
1H	Higher tier	Paper 1H	62	49	37	28	21	14			
2H/3H	Higher tier	Paper 2H/3H	64	52	41	31	22	15			
Total	**Higher tier**		**135**	**109**	**85**	**65**	**48**	**33**			

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