Practice Tests Set 17 – Paper 1H mark scheme, performance data and suggested grade boundaries

Q		Working	Answer	Mark		Notes
1	(a)	$5 \times (-2)^2 - (-2)^3$ ($= 20 - -8$)		2	M1	for correct expression or at least one of 20 or 5×4 or $- - 8$ or (+) 8
			28		A1	
	(b)		$2p(4p - 1)$	2	B2	B1 for $p(8p - 2)$ or $2(4p^2 - p)$ or $2p(4p - 1)$ with two terms inside the bracket with one term correct.
	(c)		$12t^2 - 8t$	2	B2	B1 for $12t^2$ or $-8t$
	(d)	$5x^2 + 20x - 2x - 8$		2	M1	for 4 correct terms (ignoring signs) or 3 correct terms with correct signs. or $5x^2 + 18x + ...$ or $\ldots + 18x - 8$
			$5x^2 + 18x - 8$		A1	
						Total 8 marks

Q	Working	Answer	Mark	Notes
2	eg $(x \pm 20)(x \pm 1)$ $\frac{-(-21) \pm \sqrt{(-21)^2 - 4 \times 1 \times 20}}{2 \times 1}$ **or** $\left(x - \frac{21}{2}\right)^2 - \left(\frac{21}{2}\right)^2 + 20 = 0$		3	M1	If factorising, allow brackets which expanded give 2 out of 3 terms correct – if using formula or completing the square allow one sign error and some simplification – allow as far as eg $\frac{21 \pm \sqrt{441 - 80}}{2}$ or eg $\left(x - \frac{21}{2}\right)^2 - \frac{361}{4} = 0$ oe
	$(x - 20)(x - 1)$	eg $\frac{21 \pm \sqrt{441 - 80}}{2}$ or $\frac{21 \pm \sqrt{361}}{2}$ or $\frac{21 \pm 19}{2}$ **or** $x = \pm\sqrt{\frac{361}{4}} + \frac{21}{2}$ oe		M1	dep on M1 for correct factorisation, or a correct expression for x if completing the square. or a correct substitution into quadratic formula with some processing.
		1, 20		A1	for both correct values, dep on 1st M1 with no incorrect working.
				Total 3 marks

Q	Working	Answer	Mark	Notes
3	eg. $10x + 35y = 85$ $10x + 6y = -2$ with the operation of subtraction **or** $29y = 87$ **or** $6x + 21y = 51$ $35x + 21y = -7$ with the operation of subtraction **or** $29x = -58$ **or** eg $5\left(\frac{17-7y}{2}\right)+3y=-1$ **or** eg $5x+3\left(\frac{17-2x}{7}\right)=-1$		4	M1 for correct method to eliminate one variable – multiplying one or both equations so the coefficient of x or y is the same in both, with the correct operation to eliminate one variable (condone one arithmetic error) **or** isolating x or y in one equation and substituting into the other (condone one arithmetic error).
				M1 dep 1st M1 Substitute found value into one equation **or** correct method to eliminate second unknown.
		$x = -2$ $y = 3$		A1 dep 1st M1 A1
				Total 4 marks

Q	Working	Answer	Mark	Notes
4	E.g. x2 + 4x – 2x – 8 (= x2 + 2x – 8) or x2 – 2x + x – 2 (= x2 − x – 2) or x2 + 4x + x + 4 (= x2 + 5x + 4)		3	M1 for multiplying out two brackets correctly with no more than one error
	E.g. x3 + 2x2 − 8x + x2 + 2x – 8 or x3 + 4x2 − 2x2 − 8x + x2 + 4x − 2x – 8 or x3 − x2 − 2x + 4x2 − 4x – 8 or x3 − 2x2 + x2 − 2x + 4x2 − 8x + 4x – 8 or x3 + 5x2 + 4x − 2x2 − 10x – 8 or x3 + 4x2 + x2 + 4x − 2x2 − 8x − 2x – 8			M1 for at least 3 terms correct out of a maximum of 6 terms or for at least 4 terms correct out of a maximum of 8 terms
		x3 + 3x2 − 6x – 8		A1
				Total 3 marks

Q		Working	Answer	Mark	Notes
5	a	e.g. $A + 5z = \frac{c}{y}$ oe **or** $Ay = c - 5yz$ oe		2	M1 for a correct first step e.g. add $5z$ to both sides **or** multiply all terms by y
			$c = y(A + 5z)$		A1 oe
	b		1	1	B1
	c	$(x \pm 3)(x \pm 8)$		2	M1 or for $(x \pm a)(x \pm b)$ where $ab = 24$ or $a + b = -11$
			$(x - 3)(x - 8)$		A1
					Total 5 marks

6	(a)		$81k^8$	2	B2 B1 for 81 or k^8 seen in their final answer.
	(b)		$7m^4n^6$	2	B2 B1 for $7m^4$ or n^6 in a product with no other terms in m or n
					Total 4 marks

Q	Working	Answer	Mark	Notes
7	E.g. $\frac{3(2x+1)+4(x-2)}{12}$ or $\frac{3(2x+1)}{12}+\frac{4(x-2)}{12}$		3	M1 for expressing both fractions correctly with a common denominator. Allow as two separate fractions.
	E.g. $\frac{6x+3+4x-8}{12}$			M1 for removing brackets correctly in a correct single fraction
		$\frac{10x-5}{12}$		A1 accept $\frac{5(2x-1)}{12}$
				Total 3 marks

Q	Working	Answer	Mark	Notes
8	e.g. $\frac{16}{5}$ **and** $\frac{11}{6}$ or $\frac{96}{30}$ **and** $\frac{55}{30}$		3	M1 for two correct improper fractions
	e.g. $\frac{\cancel{16}^{8}}{5}\times\frac{11}{\cancel{6}^{3}}$ **or** $\frac{176}{30}$ **or** $\frac{5280}{900}$ oe			M1 correct cancelling or multiplication of numerators and denominators without cancelling
	e.g. $\frac{16}{5}\times\frac{11}{6}=\frac{176}{30}=\frac{88}{15}=5\frac{13}{15}$ **or** $\frac{16}{5}\times\frac{11}{6}=\frac{176}{30}=5\frac{26}{30}=5\frac{13}{15}$ **or** $\frac{\cancel{16}^{8}}{5}\times\frac{11}{\cancel{6}^{3}}=\frac{88}{15}=5\frac{13}{15}$ **or** $\frac{96}{30}\times\frac{55}{30}=\frac{5280}{900}=\frac{88}{15}=5\frac{13}{15}$ NB: a student can show initially that $5\frac{13}{15}=\frac{88}{15}$ and they need to show that LHS $=\frac{88}{15}$	shown		A1 Dep on M2 for conclusion to $5\frac{13}{15}$ from correct working – either sight of the result of the multiplication e.g. $\frac{176}{30}$ must be seen and equated to $\frac{88}{15}$ or $5\frac{26}{30}$ **or** correct cancelling prior to the multiplication to $\frac{88}{15}$ NB: use of decimals scores no marks
				Total 3 marks

9		$4e^5f^3$	2	B2 (B1 for 2 out of 3 terms correct in a 3 term product)
				Total 2 marks

Q	Working	Answer	Mark	Notes
10	eg $(2^3)^2 \times \sqrt[3]{(2^2)^6}$ **or** $(2^3)^2 \times (4)^{\frac{6}{3}}$ **or** $4^3 \times 4^2$ **or** 2^6 or 2^4 seen **or** $2^6 \times 16$ or 64×4^2 or $8^2 \times 4^2$ or $8^2 \times 16$ or 64×16		3	M1 a correct first stage.
	$2^6 \times (2^{12})^{\frac{1}{3}}$ **or** 1024 **or** 32^2 **or** 4^5 or $2^6 \times 2^4$			M1 dep on 1st M mark.
		2^{10}		A1 dependent on first M1 isw if 2^{10} seen but then 10 given as answer.
				Total 3 marks

11	(a)	vertices at (–9, 6) (–9, 9) (–3, 9) (–6, 6)	Shape in correct position	2	B2	B1 for congruent shape in correct orientation but wrong position **or** quadrilateral with 2 or 3 vertices correct.
	(b)	vertices at (7, 3) (10, 6) (13, 6) (13, 3)	Shape in correct position	1	B1	
	(c)		enlargement scale factor 2 centre (– 3, 3)	3	B1 B1 B1	for enlargement, enlarge, etc so long as no mention of rotation, reflection or translation, flip, move etc. SF 2, double, two times etc. (– 3, 3) stated. Accept about, from etc. with no mention of line, or column vector.
						Total 6 marks

Q	Working	Answer	Mark	Notes
12	$\frac{5}{x+2}+\frac{3}{x(x+2)}$ $(=2)$ or $\frac{5x}{x^2+2x}+\frac{3}{x^2+2x}$ $(=2)$		5 M1	Factorising $x^2 + 2x$ in correct expression on LHS or for writing the two fractions over a common denominator.
	$\frac{5x+3}{x(x+2)}=2$ **or** $\frac{5x+3}{x^2+2x}=2$ **or** $5x + 3 = 2x(x + 2)$ oe **or** $5x + 3 = 2x^2 + 4x$ oe		M1	Correct simplified single fraction = 2 or correct equation with no fractions.
	$2x^2 – x – 3$ $(= 0)$		M1	Correct 3 term quadratic
	$(2x – 3)(x + 1)$ $(=0)$ **or** $\frac{--1\pm\sqrt{(-1)^2-4\times2\times(-3)}}{2\times2}$ **or** $\left(x-\frac{1}{4}\right)^2-\frac{1}{16}-\frac{3}{2}=0$ oe		M1ft	independent For solving *their* 3 term quadratic equation using any correct method. If factorising, allow brackets which expanded give 2 out of 3 terms correct (if using formula or completing the square allow one sign error and some simplification – allow as far as eg $\frac{1\pm\sqrt{1+24}}{4}$ or eg $\left(x-\frac{1}{4}\right)^2=\frac{25}{16}$ oe
		1.5 and –1	A1	oe dep on M3
				Total 5 marks

Q	Working	Answer	Mark	Notes
13	E.g. $(x-5)^2-5^2$ (+ 40) or $(x-5)^2-25$ (+ 40) $\left(x^2+2ax+a^2\left(+b^2\right)\right)$ $2a=-10$ or $a=-5$		2	M1 for a correct first step **or** for equating coefficients
		$(x-5)^2+15$		A1 accept $a=-5$, $b=15$ SC B1 for $(-x+5)^2+15$ or $(5-x)^2+15$
				Total 5 marks

14	$(n^{-\frac{4}{5}}=)\frac{1}{16}$ or 0.0625 oe	eg $\left(n^{-\frac{1}{5}}\right)^4=\left(\frac{1}{2}\right)^4$		4	M1 for sight of $\frac{1}{16}$ oe, even if raised to an incorrect power. **or** for algebraic approach, separating out the 4, or 5 or -1 in the power
	$(n=)$ $16^{\frac{5}{4}}$ or $0.0625^{-\frac{5}{4}}$ oe $(n=)$ 2^5 or $\sqrt[4]{1048576}$ oe or $\frac{1}{0.0625^{\frac{5}{4}}}$ or $\left(\frac{1}{16}\right)^{-\frac{5}{4}}$	eg $(n=)$ $\left(\frac{1}{2}\right)^{-5}$			M2 for a correct expression for n (M1 for one correct algebraic stage eg $n^{-\frac{1}{5}}=\frac{1}{2}$)
			32		A1
					Total 7 marks

Q	Working		Answer	Mark	Notes
15	x = 4.57.... and 100x = 457.57.... or 10x = 45.757.... and 1000x = 4575.7.... or x = 0.57.... and 100x = 57.57.... or 10x = 5.757.... and 1000x = 575.7....		2	M1	for selecting 2 recurring decimals that when subtracted give a whole number or terminating decimal eg 453 or 4530 etc eg 100x = 457.57.... and x = 4.57.... or 1000x = 4575.7....and 10x = 45.757.... with intention to subtract. (If recurring dots not shown then allow 10x = 45.757, 100x = 457.57, and 1000x = 4575.7 to at least 5sf) or 4 + 0.5757 and eg x = 0.57.... , 100x = 57.57.... with intention to subtract.
	E.g. 100x – x = 457.57.... – 4.57.... = 453 and $\frac{453}{99} = \frac{151}{33}$ or $4\frac{19}{33}$ or 1000x – 10x = 4575.7.... – 45.757.... = 4530 and $\frac{4530}{990} = \frac{151}{33}$ or $4\frac{19}{33}$ or 100x – x = 57.57.... – 0.57.... = 57 and $\frac{57}{99}$ or $\frac{19}{33}$ (so) $4.\dot{5}\dot{7} = 4\frac{19}{33}$ 1000x – 10x = 575.7.... – 5.757.... = 570 and $\frac{570}{990}$ or $\frac{57}{99}$ or $\frac{19}{33}$ (so) $4.\dot{5}\dot{7} = 4\frac{19}{33}$	Shown		A1	**for completion to** $\frac{151}{33}$ or $4\frac{19}{33}$
					Total 2 marks

Q	Working	Answer	Mark	Notes
16	e.g. $\begin{pmatrix}5\\3\end{pmatrix}-\begin{pmatrix}-2\\4\end{pmatrix}$ **or** $\begin{pmatrix}5\\3\end{pmatrix}+\begin{pmatrix}2\\-4\end{pmatrix}$	2	M1	**or** for $\begin{pmatrix}7\\a\end{pmatrix}$ where $a \neq -1$ **or** $\begin{pmatrix}b\\-1\end{pmatrix}$ where $b \neq 7$
		$\begin{pmatrix}7\\-1\end{pmatrix}$	A1	
				Total 2 marks

Q	Working	Answer	Mark	Notes
17		$y \geq 1$ oe $x \leq 3$ oe $y \leq 3x - 2$ oe	3	B1 Allow $1 \leq y \leq 7$ B1 Allow $1 \leq x \leq 3$ B1 Condone < and > in place of ≤ and ≥ throughout. SC B1 if no marks awarded, recognition of lines $x = 3$ **and** $y = 1$. Allow incorrect inequality and condone use of equals signs eg $y < 1$, $x = 3$ may be seen on diagram.
				Total 3 marks

Q	Working	Answer	Mark	Notes
18 a		$2^6 \times 3 \times 11^4$	2	B2 oe, accept 2 811 072 B1 for $2^a \times 3^b \times 11^c$ oe where two of *a*, *b* and *c* are correct
b		$2^9 \times 3^5 \times 11^8$	2	B2 cao B1 for $2^a \times 3^b \times 11^c$ oe where two of *a*, *b* and *c* are correct **or** $2.666... \times 10^{13}$ **or** an equivalent expression for e.g. $2^2 \times 2^7 \times 3^5 \times 11^3 \times 11^5$
				Total 4 marks

Q	Working	Answer	Mark	Notes
19	$y(6y + 5) – 2y^2 = 6$	$x\left(\frac{x-5}{6}\right)-2\left(\frac{x-5}{6}\right)^2=6$	5	M1 for substitution of linear equation into quadratic **or** multiplying linear equation by y e.g. $xy – 6y^2 = 5y$ **and** intention to subtract the two equations
	E.g. $4y^2 + 5y – 6$ (= 0) oe $4y^2 + 5y = 6$	E.g. $4x^2 – 10x – 266$ (= 0) oe $4x^2 – 10x = 266$		A1 (dep on M1) writing the correct quadratic expression in form $ax^2 + bx + c$ (= 0) allow $ax^2 + bx = c$
	E.g. $(4y − 3)(y + 2)$ (= 0) $(y =) \frac{-5\pm\sqrt{5^2-4\times4\times-6}}{2\times4}$ $4\left[\left(y+\frac{5}{8}\right)^2-\left(\frac{5}{8}\right)^2\right]=6$ oe	E.g. $(2x – 19)(x + 7)$ (= 0) $(x =) \frac{5\pm\sqrt{(-5)^2-4\times2\times(-133)}}{2\times2}$ $4\left[\left(x-\frac{10}{8}\right)^2-\left(\frac{10}{8}\right)^2\right]=266$ oe		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 $\frac{-5\pm\sqrt{25+96}}{8}$ or $\frac{5\pm\sqrt{25+1064}}{4}$
	$(y =) \frac{3}{4}$ and $(y =) −2$	$(x =) \frac{19}{2}$ and $(x =) −7$		A1 Dep on first M1 for having two correct x values or two correct y values
		$x = \frac{19}{2}, y = \frac{3}{4}$ $x = −7, y = −2$		A1 Dep on first M1 Must be paired and labelled correctly
				Total 5 marks

Q	Working	Answer	Mark	Notes
20	$\left(4^{k+3}=\right)\left(2^2\right)^{k+3}$ oe **or** $\left(16=\right)2^4$ $\left(16=\right)4^2$ **or** $\left(2^k=\right)\left(4^{\frac{1}{2}}\right)^k$ oe $\left(4^{k+3}=\right)\left(16^{\frac{1}{4}}\right)^{k+3}$ oe **or** $\left(2^k=\right)\left(16^{\frac{1}{4}}\right)^k$ oe		4	M1 for $\left(2^2\right)^{k+3}$ oe **or** 2^4 **or** 4^2 **or** $\left(4^{\frac{1}{2}}\right)^k$ oe **or** $\left(16^{\frac{1}{4}}\right)^{k+3}$ oe **or** $\left(16^{\frac{1}{4}}\right)^k$ oe
	$\left(4^{k+3}=\right)\left(2^2\right)^{k+3}$ oe **and** $\left(16=\right)2^4$ $\left(16=\right)4^2$ **and** $\left(2^k=\right)\left(4^{\frac{1}{2}}\right)^k$ oe $\left(4^{k+3}=\right)\left(16^{\frac{1}{4}}\right)^{k+3}$ oe **and** $\left(2^k=\right)\left(16^{\frac{1}{4}}\right)^k$ oe			M1 for $\left(2^2\right)^{k+3}$ oe **and** 2^4 **or** 4^2 **and** $\left(4^{\frac{1}{2}}\right)^k$ oe **or** $\left(16^{\frac{1}{4}}\right)^{k+3}$ oe **and** $\left(16^{\frac{1}{4}}\right)^k$ oe
	E.g. $2k+6=4+k$ **or** $k+3=2+\frac{1}{2}k$ **or** $\frac{1}{2}(k+3)=1+\frac{1}{4}k$			M1 for a correct linear equation in k
		-2		A1 dep on at least M2
				Total 9 marks

Q	Working	Answer	Mark	Notes
21	$\left(\frac{-1+2}{2}, \frac{5+10}{2}\right)$ **or** (0.5, 7.5) oe		5	M1	
	$\frac{10-5}{2-(-1)}\left(=\frac{5}{3}\right)$ oe			M1	
	$m \times$ '$\frac{5}{3}$' $= -1$ oe **or** $m = -\frac{3}{5}$oe			M1	ft their gradient for use of $m_1 \times m_2 = -1$
	'7.5' = '$-\frac{3}{5}$' $\times$ '0.5' $+ c$ **or** $c = 7.8$ oe **or** $y - '7.5' = '-\frac{3}{5}'(x - '0.5')$			M1	ft dep on first M1 and third M1
		$5y + 3x = 39$		A1	oe where p, q and r must be integers
				Total 5 marks

Practice Tests Set 17 – Paper 1H mark scheme, performance data and suggested grade boundaries

Q	Working	Answer	Mark	Notes

				Edexcel averages: scores of candidates who achieved grade:								
Qn	Mean score	Max score	Mean %	ALL	9	8	7	6	5	4	3	U
1	7.34	8	92	7.34	7.93	7.71	7.69	7.25	6.42	4.52	2.46	0.72
2	2.49	3	83	2.49	2.91	2.80	2.69	2.07	1.65	0.62	0.18	0.00
3	3.40	4	85	3.40	3.96	3.90	3.53	3.26	2.31	0.92	0.09	0.00
4	2.47	3	82	2.47	2.95	2.84	2.61	2.09	1.47	0.96	0.13	0.00
5	4.02	5	80	4.02	4.86	4.56	4.08	3.45	2.70	1.42	0.61	0.14
6	3.27	4	82	3.27	3.79	3.57	3.25	2.78	2.08	1.62	0.77	0.14
7	2.39	3	80	2.39	2.86	2.57	2.39	1.95	1.68	1.15	0.22	0.00
8	2.27	3	76	2.27	2.63	2.46	2.32	2.16	1.45	1.24	0.87	0.29
9	1.60	2	80	1.60	1.94	1.81	1.52	1.31	0.85	0.58	0.22	0.00
10	2.29	3	76	2.29	2.94	2.68	1.99	1.57	1.08	0.27	0.23	0.29
11	3.98	6	66	3.98	5.30	4.54	3.34	2.83	2.27	1.46	0.60	0.43
12	3.12	5	62	3.12	4.55	3.62	2.60	1.55	1.00	0.15	0.09	0.00
13	1.30	2	65	1.30	1.90	1.57	0.99	0.67	0.20	0.13	0.00	0.00
14	2.51	4	63	2.51	3.75	2.66	1.93	1.45	0.74	0.31	0.18	0.14
15	1.16	2	58	1.16	1.65	1.32	0.93	0.50	0.35	0.07	0.00	0.00
16	1.20	2	60	1.20	1.86	1.28	0.91	0.57	0.32	0.11	0.04	0.00
17	1.82	3	61	1.82	2.68	2.14	1.36	0.64	0.39	0.13	0.05	0.00
18	2.35	4	59	2.35	3.39	2.39	1.79	1.33	0.78	0.51	0.00	0.00
19	2.94	5	59	2.94	4.56	3.49	2.06	1.15	0.61	0.15	0.00	0.29
20	2.33	4	58	2.33	3.79	2.56	1.20	0.96	0.22	0.11	0.00	0.00
21	2.20	5	44	2.20	3.97	2.19	0.84	0.57	0.22	0.29	0.22	0.00
	56.45	**80**	**71**	**56.45**	**74.17**	**62.66**	**50.02**	**40.11**	**28.79**	**16.72**	**6.96**	**2.44**

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Q	Working	Answer	Mark	Notes

Suggested grade boundaries

Grade	9	8	7	6	5	4	3
Mark	68	56	45	34	23	12	5