

Practice Tests (Set 21) – 1H

Q	Working	Answer	Mark	Notes
1 (a)	$n^2 - 6n + 4n - 24$		2	M1 for any 3 correct terms or for 4 out of 4 correct terms ignoring signs or for $n^2 - 2n \dots$ or for $\dots - 2n - 24$
		$n^2 - 2n - 24$		A1 oe
(b)	$8x - 12$ or $\frac{3}{4}x - \frac{5}{4}$ oe or $0.75x - 1.25$ oe		3	M1 for correct multiplication by 4 or separate fractions on the RHS
	$8x - 3x = -5 + 12$ oe or $5x = 7$ oe or $2x - \frac{3}{4}x = -\frac{5}{4} + 3$ or $2x - 0.75x = -1.25 + 3$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation and number terms on the other
		$\frac{7}{5}$		A1 oe dep on M1 1.4 or $1\frac{2}{5}$ oe
				Total 5 marks

Q	Working	Answer	Mark	Notes
2 (a)		0.8 and 0.2 0.3 and 0.7 0.6 and 0.4	2	B2 for all 3 correct pairs of probabilities on the correct branches (B1 for 2 correct pairs of probabilities on the correct branches) Allow equivalent fractions
(b)	“0.8” × “0.3”		2	M1ft (Both probabilities must be less than 1)
		0.24		A1ft oe
				Total 4 marks

Q	Working	Answer	Mark	Notes
3 (a)		8.9×10^{-5}	1	B1
(b)		83 400	1	B1
				Total 2 marks

Q	Working	Answer	Mark	Notes
4 (i)	$(x \pm 3)(x \pm 8)$	2	M1	Or $(x + a)(x + b)$ where $ab = -24$ or $a + b = 5$
		$(x - 3)(x + 8)$	A1	
(ii)		3, -8	1	B1ft ft from their incorrect factors if M1 scored in (i)
				Total 3 marks

Q	Working	Answer	Mark	Notes
5	$\frac{16}{3} - \frac{20}{7}$ or $(5)\frac{7}{21} - (2)\frac{18}{21}$ or $(5)\frac{7a}{21a} - (2)\frac{18a}{21a}$		3	M1 for correct improper fractions or fractional part of numbers written correctly over a common denominator
	$\frac{112}{21} - \frac{60}{21}$ or $\frac{112a}{21a} - \frac{60a}{21a}$ or $5\frac{7}{21} - 2\frac{18}{21} = 3 - \frac{11}{21}$ oe			M1 for correct fractions with a common denominator or a multiple of 21
	$\frac{112}{21} - \frac{60}{21} = \frac{52}{21} = 2\frac{10}{21}$ oe or $3 - \frac{11}{21} = 2\frac{10}{21}$	Shown		A1 Dep on M2 for a correct answer from fully correct working
				Total 3 marks

Q	Working	Answer	Mark	Notes
6			3	M1 for $d = 9$ or $(c + d) \div 2 = 8$ or $d - a = 4$
				M1 for two of the above
		$a = 5, b = 6,$ $c = 7, d = 9$		A1 All correct
				Total 3 marks

Q	Working	Answer	Mark	Notes
7	eg $+7x+3y=3$ or $-21x+9y=9$ $9x-3y=21$ or $21x-7y=49$ or eg $7x+3(3x-7)=3$ or $7\left(\frac{7+y}{3}\right)+3y=3$		3	M1 A correct method to eliminate x or y – multiplying one or both equations so that one value can be eliminated and the correct operation to eliminate or for substitution of one variable into the other equation.
				M1 A correct method to calculate the other letter eg substitution or starting again with elimination or substitution
		$x = 1.5, y = -2.5$		A1
				Total 3 marks

Q	Working	Answer	Mark	Notes
8	$28 \times 12 (=336)$		4	M1 For a correct method to find the area of the rectangle (may be seen as part calculation)
	$28 \times 12 + 0.5 \times (28 - 5 - 5 + CD) \times (20 - 12) = 434$ oe eg $0.5 \times (18 + CD) \times 8 = 434 - 336$			M1 A correct equation involving CD
	Eg “288” + $16CD =$ “196”			M1 A correct simplified (no fractions or brackets) equation for CD
		6.5		A1
				Total 4 marks

Q		Working	Answer	Mark	Notes
9	(a)		8	1	B1
	(b)		11	1	B1 accept x^{11}
	(c)		$8k^6m^{12}$	2	B2 for all correct B1 for two correct from 8 or k^6 or m^{12}
					Total 4 marks

Q		Working	Answer	Mark	Notes
10	(a)		7, 32, 52, 64, 71, 76, 80	1	B1
	(b)			2	B2 Fully correct cf graph – points at ends of intervals and joined with curve or line segments. If not B2 then B1(ft from a table with only one arithmetic error) For 6 or 7 of their points at ends of intervals and joined with curve or line segments OR for 6 or 7 points plotted correct at ends of intervals not joined OR for 6 or 7 points from table plotted consistently within each interval (not at upper ends of intervals) at their correct heights and joined with smooth curve or line segments.
	(c)		32-34	1	B1 Any value in range
	(d)			3	M1 For readings taken at 18 and 65 (eg 6 and 74)
		eg $(74 - 6) \times 0.6$ oe			M1 ft
		39 - 43		A1 ft their graph but answer must be whole number	
					Total 7 marks

Q	Working	Answer	Mark	Notes
11		Fully correct Venn diagram	3	B1 For 13 correct in G only B2 For all 7 others correct (B1 for 4, 5 or 6 others correct)
				Total 3 marks

Q	Working	Answer	Mark	Notes
12 (a)			2	M1 for $4n + k$ ($k \neq -3$) or $4 \times n + k$ ($k \neq -3$) or $n \times 4 + k$ ($k \neq -3$) (k may be zero or absent)
		$4n - 3$		A1 oe e.g. $1 + (n - 1)4$ oe or $4 \times n - 3$ oe or $n \times 4 - 3$ oe NB: award full marks for eg $x = 4n - 3$ oe or $x = 4 \times n - 3$ oe or $x = n \times 4 - 3$ oe or n th term = $4n - 3$ oe or n th term = $4 \times n - 3$ oe or n th term = $n \times 4 - 3$ oe but only M1 for $n = 4n - 3$ oe
(b)		$6m + 5$	1	B1 for $3(2m) + 5$ oe or $6m + 5$ or $3 \times 2m + 5$ oe or $6 \times m + 5$ Allow $3(2n) + 5$ or $6n + 5$ oe
				Total 3 marks

Q	Working	Answer	Mark	Notes
13 (a)	eg $\frac{2(4x+5)-3(3-2x)}{6} = 13$ oe or $2(4x+5)-3(3-2x) = 13 \times 3 \times 2$ oe		4	M1 Writing fractions over a common denominator or removing denominator
	eg $8x + 10 - 9 + 6x = 78$			M1 Removing brackets and fractions
	eg $8x + 6x = 78 - 10 + 9$ oe eg $14x = 77$			M1 Terms in x on one side and number terms the other in a correct equation.
		5.5		A1 dep on M2
(b)	$(2y + 5)(y - 6)$		3	M1 For correct factorisation or correct use of quadratic formula
	$y = 6, y = -2.5$			M1 Correct critical values
		$-2.5 \leq y \leq 6$		A1 oe
				Total 7 marks

Q	Working	Answer	Mark	Notes
14 (a)	$(5-x)(2x+3) = 10x + 15 - 2x^2 - 3x$ $(= -2x^2 + 7x + 15)$ $(5-x)(x+4) = 5x + 20 - x^2 - 4x$ $(= -x^2 + x + 20)$ $(2x+3)(x+4) = 2x^2 + 8x + 3x + 12$ $(= 2x^2 + 11x + 12)$		3	M1 The product of 2 brackets 3 out of 4 terms correct
	$(-2x^2 + 7x + 15)(x+4) =$ $-2x^3 - 8x^2 + 7x^2 + 28x + 15x + 60$ $(-x^2 + x + 20)(2x+3) =$ $-2x^3 - 3x^2 + 2x^2 + 3x + 40x + 60$ $(2x^2 + 11x + 12)(5-x) =$ $10x^2 - 2x^3 + 55x - 11x^2 + 60 - 12x$			M1 ft for 4 terms correct
		$-2x^3 - x^2 + 43x + 60$		A1 cao (terms may be in any order but must be simplified)
(b)	$g+7 = \frac{c+3}{4+c}$ or $g(4+c) = c+3 - 7(4+c)$		4	M1 Adding 7 to both sides or removing fraction
	eg $4g + gc + 28 + 7c = c + 3$ or $4g + gc = c + 3 - 28 - 7c$ oe			M1 Removing fraction and expanding all brackets
	eg $gc + 7c - c = 3 - 28 - 4g$ or $28 - 3 + 4g = c - 7c - gc$			M1 Terms in c on one side and other terms on the other side in a correct equation
			$c = \frac{-(4g+25)}{g+6}$	A1 oe eg $c = \frac{25+4g}{-6-g}$
				Total 7 marks

Q		Working		Answer	Mark	Notes
15	(a)			5	1	B1 cao
	(b)	$y(x-6) = 2x$ $yx - 6y = 2x$	$x(y-6) = 2y$ $xy - 6x = 2y$		3	M1 for multiplying the denominator
		$x(y-2) = 6y$	$y(x-2) = 6x$			M1 for isolating the x or y terms and factorising
				$\frac{6x}{x-2}$		A1 accept $\frac{-6x}{2-x}$ (must be a function of x)
						Total 4 marks

Q	Working	Answer	Mark	Notes
16 (a)	$(3x \pm 2y)(3x \pm 2y)$ or $(3x)^2 - (2y)^2$		2	M1
		$(3x+2y)(3x-2y)$		A1
(b)	$\frac{7(4x)}{32x} - \frac{8(x+3)}{32x}$ oe or $\frac{7(4x)}{8(4x)} - \frac{8(x+3)}{8(4x)}$ oe or $\frac{28x}{32x} - \frac{8(x+3)}{32x}$ oe or $\frac{28x}{32x} - \frac{8x+24}{32x}$ oe or $\frac{28x-8(x+3)}{32x}$ oe or $\frac{7x}{8x} - \frac{2(x+3)}{8x}$ oe or $\frac{7x-2(x+3)}{8x}$ oe		3	M1 for two correct fractions with common denominator or a single correct fraction
	$\frac{28x-8x-24}{32x}$ oe or $\frac{20x-24}{32x}$ oe or $\frac{7x-2x-6}{8x}$ oe or $\frac{20x}{32x} - \frac{24}{32x}$ oe or $\frac{28x}{32x} - \frac{8x}{32x} - \frac{24}{32x}$ oe			M1 for correct fraction(s) with bracket(s) expanded and dealing with the negative signs
		$\frac{5x-6}{8x}$		A1 or $\frac{-6+5x}{8x}$
				Total 5 marks

Q	Working	Answer	Mark	Notes
17	$(a =) \frac{14}{3 \times \frac{7}{4y-3} - 7}$		3	M1 For a correct substitution
	$(a =) \frac{14(4y-3)}{21-7(4y-3)}$ oe eg $\frac{56y-42}{21-28y+21}$			M1 Or for a correct but unsimplified answer
		$\frac{4y-3}{3-2y}$		A1 oe but must be simplified
				Total 3 marks

Q	Working	Answer	Mark	Notes
18	$\frac{12}{\sqrt{2}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}+1} \text{ or } \frac{12}{\sqrt{2}-1} \times \frac{-\sqrt{2}-1}{-\sqrt{2}-1}$ <p>and</p> $4\sqrt{2} \text{ or } 2\sqrt{8} \text{ or } \sqrt{32} \text{ oe}$			3 M1 for showing a correct method for rationalising the denominator and dealing with $(\sqrt{2})^5$
	<p>E.g. $12\sqrt{2}+12-4\sqrt{2}$ or $8\sqrt{2}+12$</p> $12\sqrt{2}+12-2\sqrt{8}$ or $12\sqrt{2}+12-\sqrt{32}$ oe			M1 dep expression must be in surd form
	<p>E.g. $12\sqrt{2}(+12)-4\sqrt{2}=8\sqrt{2}(+12)=2\sqrt{4^2 \times 2}(+12)=2\sqrt{32}(+12)$</p> <p>or</p> $12\sqrt{2}(+12)-2\sqrt{8}=6\sqrt{8}(+12)-2\sqrt{8}=4\sqrt{8}(+12)=2\sqrt{4 \times 8}(+12)=2\sqrt{32}(+12)$ <p>or</p> $12\sqrt{2}(+12)-\sqrt{32}=3\sqrt{4^2 \times 2}(+12)-\sqrt{32}=2\sqrt{32}(+12)$ oe <p>Note</p> $8\sqrt{2}=2\sqrt{4^2 \times 2}$ or $2\sqrt{16 \times 2}$ or $\sqrt{32 \times 4}$ or $\sqrt{64 \times 2}$ $12\sqrt{2}=3\sqrt{4^2 \times 2}$ or $3\sqrt{16 \times 2}$ or $\sqrt{32 \times 9}$	Shown		A1 dep on M2 for showing working to given answer (they may dismiss the +12 and just deal with the surd part for this stage)
				Total 3 marks

Q	Working	Answer	Mark	Notes	
19	eg $\frac{2 \times 3 \times 3 \times (3^{\frac{3}{2}})^{4n+6}}{2 \times 3 \times 3^{2(2n+8)}} \text{ or } \frac{3 \times 3^{\frac{3}{2}(4n+6)}}{3^{2(2n+8)}}$	3	M1 For 2 of: writing 18 as 2×3^2 oe and 6 as 2×3 or cancelling 6 & 18 writing $\sqrt{27}$ as $3^{\frac{3}{2}}$ writing 9 as 3^2		
	eg $\frac{3 \times 3^{6n+9}}{3^{4n+16}} \text{ or } \frac{3^{6n+10}}{3^{4n+16}}$				M1 For use of only powers of 3 on numerator and denominator
					A1 oe eg $2(n-3)$
				Total 3 marks	

Q	Working	Answer	Mark	Notes
20	$-q \left(x^2 - \frac{12}{q}x \right) + q \text{ or } -q \left(x^2 - \frac{12}{q}x - \frac{q}{q} \right) \text{ oe}$		4	M1 for a correct factorisation of the expression or $b = q$ (must be stated)
	$-q \left[\left(x - \frac{12}{2q} \right)^2 \dots \right] \text{ oe or } -q \left[\left(x - \frac{6}{q} \right)^2 \dots \right] \text{ oe}$			M1 for starting the correct process to complete the square
	E.g. $-q \left(x - \frac{6}{q} \right)^2 + \frac{36}{q} + q \text{ oe or}$ $-q \left(x - \frac{12}{2q} \right)^2 + \frac{144q}{4q^2} + q \text{ oe}$			M1 for a complete process of completing the square. (Does not need to be simplified)
		$a = \frac{36}{q} + q$ $b = q$ $c = \frac{6}{q}$		A1 oe a and c must come from a correct process of completing the square. (Does not need to be simplified)
				Total 4 marks

Q	Working	Answer	Mark	Notes
20 ALT	$a - bx^2 + 2bcx - bc^2$ oe or $-bx^2 + 2bcx - bc^2 + a$ oe or $b = q$		4	M1 for correctly multiplying out $a - b(x - c)^2$
	$2bc = 12$ or $a - bc^2 = q$ oe			M1 for correctly equating coefficients
	$c = \frac{12}{2q}$ or $a = q\left(\frac{12}{2q}\right)^2 + q$ or $c = \frac{6}{q}$ or $a = q\left(\frac{6}{q}\right)^2 + q$			M1 for correctly finding a or c (Does not need to be simplified)
		$a = \frac{36}{q} + q$ $b = q$ $c = \frac{6}{q}$		A1 oe (Does not need to be simplified)
				Total 4 marks

Qn	Max score	Mean %	Average score of candidates achieving grade:								
			ALL	9	8	7	6	5	4	3	U
1	5	88	4.38	4.96	4.88	4.71	4.30	3.59	2.65	1.56	0.52
2	4	87	3.46	3.96	3.91	3.76	3.40	2.76	1.87	1.01	0.38
3	2	91	1.82	1.95	1.93	1.87	1.81	1.68	1.50	1.20	0.87
4	3	86	2.58	2.98	2.93	2.80	2.49	2.05	1.31	0.51	0.10
5	3	87	2.61	2.90	2.84	2.74	2.57	2.25	1.80	1.21	0.59
6	3	84	2.51	2.93	2.83	2.67	2.40	1.99	1.31	0.66	0.30
7	3	80	2.40	2.94	2.84	2.61	2.15	1.61	1.02	0.42	0.08
8	4	80	3.19	3.95	3.80	3.45	2.83	2.08	1.19	0.53	0.14
9	4	79	3.14	3.89	3.59	3.23	2.75	2.25	1.75	1.16	0.49
10	7	69	4.81	6.28	5.66	4.89	4.08	3.09	2.06	1.09	0.37
11	3	65	1.96	2.83	2.50	1.97	1.38	0.86	0.39	0.11	0.05
12	3	65	1.94	2.72	2.30	1.90	1.49	1.15	0.73	0.38	0.13
13	7	58	4.06	6.36	5.18	3.83	2.43	1.50	0.83	0.35	0.07
14	7	58	4.05	6.22	4.90	3.80	2.76	1.87	1.04	0.39	0.07
15	4	54	2.17	3.70	2.72	1.79	1.13	0.76	0.52	0.28	0.09
16	5	40	2.02	3.86	2.39	1.53	0.91	0.55	0.27	0.13	0.02
17	3	26	0.79	1.70	0.87	0.53	0.26	0.12	0.05	0.01	0.00
18	3	19	0.57	1.55	0.50	0.17	0.06	0.02	0.00	0.00	0.00
19	3	13	0.39	1.21	0.21	0.06	0.02	0.01	0.00	0.00	0.00
20	4	9	0.36	1.11	0.18	0.07	0.03	0.02	0.02	0.02	0.01
	80	62	49.21	68.00	56.96	48.38	39.25	30.21	20.31	11.02	4.28

Suggested grade boundaries

Grade	9	8	7	6	5	4	3
Mark	62	53	44	35	25	16	8