

The Bridge to A level

Test Yourself Mark Scheme



Section	Question	Answer	Marks	Notes
1	1	$x = \pm 3$	M2 M1 A1	Use of quadratic formula (M1) in x^2 (M1) $x^2 = 9$ cao
	2(i)	$4(x-3)^2 - 9$	B1 B1 M1A1	$a = 4$ $b = 3$ $c = -9$
	2(ii)	(3,-9)	B2	B1 for each coordinate
2	1	$t = [\pm] \sqrt{\frac{2s}{a}}$ o.e.	B3	B2 for t omitted M1 for constructive first step M1 for finding square root of their 't ² '
	2	$[x =] \frac{6y}{3+m}$ as final answer	M1 M1 A1	for $3x + mx = y + 5y$ oe for $x(3 + m)$ or ft sign error
	3	$[x =] \frac{2y+3}{y-1}$ o.e. or ft	M1 M1 M1 M1	for multiplying by $x-2$ for expanding brackets for clecting x and 'other' terms for factorising and dividing Award all four marks only if fully correct
3	1	$x = \frac{7}{11}$ $y = \frac{24}{11}$ oe www	B3	B2 for one coordinate correct, or correct solution not expressed as coordinates (or) M1 for substitution or elimination of one variable oe
	2	$a = 3$ $b = 32$	M1 A1A1	Equating $5x - a$ and $2x + 18$ and substituting $x = 7$
	3	$x = -0.5$ or 1 $y = 4.25$ or 2	M1 M1 A1 A1	for $7-3x = 2(x^2 - 2x + 3)$ oe for quadratic in x ($2x^2 - x - 1 = 0$ oe) x y
4	1(i)	$3\sqrt{6}$	M1 A1	for $\sqrt{4x6}$ oe seen
	1(ii)	$10 + 2\sqrt{7}$	M1 M1 A1	for attempt to multiply num and denom by $5 + \sqrt{7}$ for 18 or $25 - 7$ seen
	2(i)	$28\sqrt{6}$	M1 A1	for $30\sqrt{6}$ or $2\sqrt{6}$ oe
	2(ii)	$49 - 12\sqrt{5}$	B2 B1	for 49 for $12\sqrt{5}$ If B0, award M1 for 3 correct terms of $4 - 6\sqrt{5} - 6\sqrt{5} + 45$

5	1(i)	9	M1 A1	for 3^2 oe
	1(ii)	8 (condone -8 or ± 8)	M1 A1	for $16^{0.25} = 2$
	2(i)	$4x^4y$	M1 A1	for two elements correct
	2(ii)	32	M1 A1	for 2^5 oe
	3	$\frac{4}{27}$	B1 B1	numerator denominator
6	1	Grad of AB = -3 Grad of BC = $\frac{1}{3}$ product of gradients = -1	B1 B1	either gradient product of gradients need to equal -1
	2	(3,6)	B1	
	3	Coordinates (0,2) (0.5,0)	M1 M1 A1A1	for $y = -4x + c$ for $y = -4x + 14$ one mark for each set of coordinates
	4	$y = 3x - 7$	M1 M1 A1	Gradient = 3 Subst in (4,5) into their ' $y = mx + c$ '
7	1	Cubic the correct way up x-axis cuts at -1, 2, 4 shown y-axis cuts at 8 shown	G1 G1 G1	
	2	Sketch of cubic correct way up Curve through (0,0) Curve touches x-axis at x=3	G1 G1 G1	
	3	Correct graph with clear asymptote at $x = 2$ (0, -0.5) shown	G2 G1	(G1 for only one branch correct0
	4	10	B1	
8	1	$y = x^2 - 8x + 5$	B1	
	2	$f(x-3) = (x-3)^3 - 5(x-3) + 2$ $(x^2 - 6x + 9)(x-3)$ $f(x-3) = x^3 - 3x^2 - 6x^2 + 18x + 9x - 27 - 5x + 15 + 2$ $= x^3 - 9x^2 + 22x - 10$	B1 B1 A1 B1	Substitution Partial expansion of cubic term All correct unsimplified Correct consolidation
	3	$f(x-4) = 2(x-4)^3 + 7(x-4)^2 - 7(x-4) - 12$ $2x^3 - 17x^2 + 33x$	M1 M1 M1	Substitution Correct expansion of one pair of brackets correct completion to given answer
	4	$(x+1-3)(x-2-3)(x-4-3)$ ie $(x-2)(x-5)(x-7)$	M1 A1	Allow one slip Oe

9	1	$\tan 42^\circ = \frac{\text{opp}}{\text{adj}}$ $0.9004 = \frac{\text{height of pole}}{15}$ 13.5(06) m = height of pole	M1 M1 A1	
	2	$\pm \frac{\sqrt{13}}{4}$	B3	B2 for either $-\frac{\sqrt{13}}{4}$ or $\frac{\sqrt{13}}{4}$ or $\pm \frac{\sqrt{13}}{\sqrt{16}}$ oe or M1 for $\sqrt{13}$ seen
	3	(0, 0) (90, 1) (270, -1) (360, 0)	B1 B1 B1 B1	
10	1(i)	C = 141.1..... Bearing = 038. 8 (accept 038.9)	M1 M1 A1 A1	Correct attempt at cosine rule Correct full method for C C Bearing
	1(ii)	3030 to 3050 acceptable	M1 A1	Correct use of $0.5xaxbxsinC$
	2	AB = 7.80 (or better, 7.799...) Area = 52.2 to 52.3	M1 A1 M1 A1	Correct use of sine rule AB $2 \times 0.5 \times \text{'their AB'} \times 11.4 \times \sin 36$ Area
11	1	$(x - 6)(x + 3) < 0$ Critical values $x = 6$ and $x = -3$ $-3 < x < 6$	M1 M1 A1	Factorise Solve for x Deduce correct range
	2	$(x-4)(x+1) > 0$ Critical values $x = 4$ and $x = -1$ $x < 4$ and $x > 1$	M1 M1 A1	Factorise Solve for x Deduce correct range
	3	$3x^2 + 6x - 90 < 0$ $(x+6)(x-5) < 0$ $-6 < x < 5$ x positive integer $0 < x < 5$	M1 M1 M1 A1	Construct equation Factorise Deduce correct range Correct interpretation of values
12	1a	$2n = \text{multiple of } 2 = \text{even therefore}$ $2n+1$ must be odd	A1	
	1b	$= 4mn + 2n + 2m + 1$ $= 2(2mn + n + m) + 1$ $2(2mn + n + m)$ must be even $2(2mn + n + m) + 1$ must be odd because the bracket is even.	M1 M1 M1 A1	Expand and simplify brackets Factorise Explain why bracket is even Deduce result must be odd
	2a	$n + (n+1) + (n+2) + (n+3) = 4n+6$	M1	Represent numbers algebraically

		$=2(2n+3)$ which is a multiple of 2 and therefore even One example of many = $12+13+14+15 = 54$ which is even though not divisible by 4 (2)	M1 A1	Factorise Conclusion with reason
	2b	$12+13+14+15 = 54$ which is even though not divisible by 4	M1 A1	Example Justification
13	1a)	$\vec{CB} = 2b - 2a$ $\vec{CN} = \frac{4}{5}(b - a)$ $\vec{MN} = \vec{MC} + \vec{CN}$ $= \frac{4}{5}b - \frac{1}{5}a$	M1 A1 M1 A1	Find CB Find CN Find MN Given in simplest form
	1b)	$\vec{MN} = \frac{4}{5}b - \frac{1}{5}a \neq \lambda b$ <i>for any value of λ and so the lines are not parallel</i>	A1	Justification relating to parallel vectors being a multiple of one another
	2a	$BC = -4b + 8a$ or $4(2a - b)$ oe	B1	
	2b	$AQ = -4a + 4b + \frac{1}{3}(-4b + 8a)$ $AQ = -\frac{4}{3}a + \frac{8}{3}b$ or $\frac{2}{3}(4b - 2a)$ oe	M1 A1	
	3	$a^2 = 25 + 64$ $ a = \sqrt{89} = 9.43$	M1 A1	Vector from diagram Use of pythagoras
14	1	TVV $\frac{5}{9} \times \frac{4}{8} \times \frac{3}{7} = \frac{5}{42}$ VTV $\frac{4}{9} \times \frac{5}{8} \times \frac{3}{7} = \frac{5}{42}$ VVT $\frac{4}{9} \times \frac{3}{8} \times \frac{5}{7} = \frac{5}{42}$ VVV $\frac{4}{9} \times \frac{3}{8} \times \frac{2}{7} = \frac{1}{21}$ $P(\text{more vegetable}) = \frac{17}{42}$	M1 M1 M1 A1	Correct outcomes chosen Multiplying each probability Adding their probabilities Correct solution
	2a	25, 10, 13, 2	M1 A1	At least 2 correct All correct

	2bi	25+13 19/25 oe	M1 A1	Addition of "their 25 and 13" seen
	li	13+2 13/15 oe	M1 A1	Addition of "their 2 and 13" seen
15	1a	50 x 0.7 = (35) 30 x 2.167 = (65)	M1 A1	M1 for at least one calculation A1 both correct
	1b	(181 + 1)/2 = 91 First three bars = 80, need 11 more for median. 11 / 2.2 = 5 70 + 5 = 75 cms	M1 M1 A1	Calculation for where median will lie
	2a	21, 36 and 51 indicated with box 0 and 103 indicated Correct plot	M1 M1 A1	
	b	1 comment each regarding Median IQR	A1 A1	Median has increased showing (statement) IQR has increased showing (statement)