**The Bridge to A level**

**Test Yourself Mark Scheme**



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| Section | Question | Answer | Marks | Notes |
| 1 | 1 | x = ± 3  | M2M1A1 | Use of quadratic formula (M1)in x2 (M1)x2 = 9 cao |
|  | 2(i) | 4 (x – 3)2 - 9 | B1B1M1A1 | a = 4b = 3c = -9  |
|  | 2(ii) | (3,-9) | B2 | B1 for each coordinate |
|  |  |  |  |  |
| 2 | 1 |  | B3 | B2 for t omittedM1 for constructive first stepM1 for finding square root of their ‘t2’ |
|  | 2 |  | M1M1A1 | for 3x + mx = y + 5y oefor x(3 + m) or ft sign error |
|  | 3 |  | M1M1M1M1 | for multiplying by x-2for expanding bracketsfor cllecting x and ‘other’ termsfor factorising and dividingAward all four marks only if fuly correct |
|  |  |  |  |  |
| 3 | 1 | x = $\frac{7}{11}$ y = $\frac{24}{11}$ oe www | B3 | B2 for one coordinate correct, or correct solution not erxpressed as coordinates(or) M1 for substitution or elimination of one variable oe  |
|  | 2 | a = 3b = 32 | M1 A1A1 | Equating 5x – a and 2x + 18 and substituting x = 7 |
|  | 3 | x = -0.5 or 1y = 4.25 or 2 | M1M1A1A1 | for 7-3x = 2(x2 – 2x + 3) oefor quadratic in x (2x2 – x – 1 = 0 oe) x y  |
|  |  |  |  |  |
| 4 | 1(i) | $$3\sqrt{6}$$ | M1A1 | for $\sqrt{4x6}$ oe seen |
|  | 1(ii) | 10 + $2\sqrt{7}$ | M1M1A1 | for attempt to multiply num and denom by 5 + $\sqrt{7}$for 18 or 25 – 7 seen |
|  | 2(i) | $$28\sqrt{6}$$ | M1A1 | for $30\sqrt{6}$ or $2\sqrt{6}$ oe |
|  | 2(ii) | 49 - 12$\sqrt{5}$ | B2B1 | for 49for 12$\sqrt{5}$If B0, award M1 for 3 correct terms of 4 - 6$\sqrt{5}$- 6$\sqrt{5}$ + 45 |
|  |  |  |  |  |
| 5 | 1(i) | 9 | M1A1 | for 32 oe |
|  | 1(ii) | 8 (condone -8 or ±8) | M1A1 | for 160.25 = 2 |
|  | 2(i) | 4x4y | M1A1 | for two elements correct |
|  | 2(ii) | 32 | M1 A1 | for 25 oe |
|  | 3 | $$\frac{4}{27}$$ | B1B1 | numeratordenominator |
|  |  |  |  |  |
| 6 | 1 | Grad of AB = -3Grad of BC = $\frac{1}{3}$product of gradients = -1 | B1B1 | either gradientproduct of gradients need to equal -1 |
|  | 2 | (3,6) | B1 |  |
|  | 3 | Coordinates (0,2) (0.5,0) | M1 M1A1A1 | for y = -4x + cfor y = -4x + 14one mark for each set of coordinates |
|  | 4 | y = 3x - 7 | M1M1A1 | Gradient = 3Subst in (4,5) into their ‘y = mx + c’ |
|  |  |  |  |  |
| 7 | 1 | Cubic the correct way upx-axis cuts at -1, 2, 4 showny-axis cuts at 8 shown | G1G1G1 |  |
|  | 2 | Sketch of cubic correct way upCurve through (0,0)Curve touches x-axis at x=3 | G1G1G1 |  |
|  | 3 | Correct graph with clear asymptote at x = 2(0, -0.5) shown | G2G1 | (G1 for only one branch correct0 |
|  | 4 | 10 | B1 |  |
|  |  |  |  |  |
| 8 | 1 | y = x2 – 8x + 5 | B1 |  |
|  | 2 | f(x – 3) = (x – 3)3 –5(x – 3) + 2 (x2 – 6x + 9)(x – 3)f(x – 3) = x3 – 3x2 – 6x2 + 18x + 9x – 27 – 5x + 15 + 2 = x3 – 9x2 + 22x - 10 | B1B1A1B1 | SubstitutionPartial expansion of cubic termAll correct unsimplifiedCorrect consolidation |
|  | 3 | f(x-4) = 2(x-4)3 + 7(x-4)2 – 7(x-4) – 122x3 – 17x2 + 33x | M1M1M1 | SubstitutionCorrect expansion of one pair of bracketscorrect completion to given answer |
|  | 4 | (x + 1 – 3)(x – 2 – 3)(x – 4 – 3)ie (x -2)(x – 5)(x – 7) | M1A1 | Allow one slipOe |
|  |  |  |  |  |

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| 9 | 1 | Tan 42° = $\frac{opp}{adj}$ 0.9004 = $\frac{height of pole}{15}$ 13.5(06) m = height of pole  | M1M1A1 |  |
|  | 2 | ± $\frac{\sqrt{13}}{4}$ | B3 | B2 for either - $\frac{\sqrt{13}}{4}$ or $\frac{\sqrt{13}}{4}$ or ± $\frac{\sqrt{13}}{\sqrt{16}}$ oeor M1 for $\sqrt{13}$ seen |
|  | 3 | (0, 0)( 90, 1)(270, -1)(360, 0) | B1B1B1B1 |  |
|  |  |  |  |  |
| 10 | 1(i) | C = 141.1…..Bearing = 038. 8 (accept 038.9) | M1M1A1A1 | Correct attempt at cosine ruleCorrect full method for CCBearing |
|  | 1(ii) | 3030 to 3050 acceptable | M1A1 | Correct use of 0.5xaxbxsinC |
|  | 2 | AB = 7.80 (or better, 7.799…)Area = 52.2 to 52.3 | M1A1M1A1 | Correct use of sine ruleAB2 x 0.5 x ’their AB’ x 11.4 x sin 36Area |
|  |  |  |  |  |
| 11 | 1 | $(x-6)(x+3)<0$ Critical values x = 6 and x = -3$-3<x<6$  | M1M1A1 | FactoriseSolve for xDeduce correct range |
|  | 2 | (x-4)(x+1) >0 Critical values x = 4 and x = -1 x < 4 and x > 1  | M1M1A1 | FactoriseSolve for xDeduce correct range |
|  | 3 | $3x^{2}+6x-90<0$ (x+6)(x-5) < 0 -6 < x < 5 x positive integer 0<x<5 | M1M1M1A1 | Construct equationFactoriseDeduce correct rangeCorrect interpretation of values |
|  |  |  |  |  |
| 12 | 1a | 2n = multiple of 2 = even therefore 2n+1 must be odd | A1 |  |
|  | 1b | = 4mn + 2n + 2m + 1= 2 ( 2mn + n + m) + 12 ( 2mn + n + m) must be even 2 (2mn + n + m) + 1 must be odd because the bracket is even. | M1M1M1A1 | Expand and simplify bracketsFactoriseExplain why bracket is evenDeduce result must be odd |
|  | 2a | n + (n+1) + (n+2) + (n+3) = 4n+6=2(2n+3)which is a multiple of 2 and therefore evenOne example of many = 12+13+14+15 = 54 which is even though not divisible by 4(2) | M1M1A1 | Represent numbers algebraicallyFactoriseConclusion with reason |
|  | 2b | 12+13+14+15 = 54which is even though not divisible by 4 | M1A1 | ExampleJustification  |
|  |  |  |  |  |
| 13 | 1a) | $\vec{CB}=2b-2a$ $$\vec{CN}=\frac{4}{5}(b-a)$$$\vec{MN}= \vec{MC}+ \vec{CN}$ $=\frac{4}{5}b-\frac{1}{5}a$  | M1A1M1A1 | Find CBFind CNFind MNGiven in simplest form |
|  | 1b) | $\vec{MN}=\frac{4}{5}b-\frac{1}{5}a \ne λb for any value of λ and so the lines are not parallel$  | 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 | M1A1 |  |
|  | 3 | $a^{2}=25+64$ $\left|a\right|=\sqrt{89}=9.43$  | M1A1 | Vector from diagramUse of pythagoras |
|  |  |  |  |  |
| 14 | 1 | TVV $ \frac{5}{9}$ x $\frac{4}{8}$ x $\frac{3}{7}$ = $\frac{5}{42}$ VTV $\frac{4}{9}$ x $\frac{5}{8}$ x $\frac{3}{7}$ = $\frac{5}{42}$ VVT $ \frac{4}{9}$ x $\frac{3}{8}$ x $\frac{5}{7}$ = $\frac{5}{42}$ VVV $\frac{4}{9}$ x $\frac{3}{8}$ x $\frac{2}{7}$ = $\frac{1}{21}$  P(more vegetable) = $\frac{17}{42}$ | M1M1M1A1 | Correct outcomes chosenMultiplying each probability Adding their probabilities Correct solution |
|  | 2a | 25, 10, 13, 2  | M1A1 | At least 2 correctAll correct |
|  | 2bi | 25+1319/25 oe | M1A1 | Addition of “their 25 and 13” seen |
|  | Ii | 13+213/15 oe | M1A1 | Addition of “their 2 and 13” seen |
|  |  |  |  |  |
| 15 | 1a | 50 x 0.7 = (35) 30 x 2.167 = (65)  | M1A1 | M1 for at least one calculationA1 both correct |
|  | 1b | (181 + 1)/2 = 91 First three bars = 80, need 11 more for median. 11 / 2.2 = 5 70 + 5 = 75 cms  | M1M1A1 | Calculation for where median will lie |
|  | 2a | 21, 36 and 51 indicated with box0 and 103 indicatedCorrect plot | M1M1A1 |  |
|  | b | 1 comment each regarding MedianIQR | A1A1 | Median has incresed showing (statement)IQR has increased showing (statement)  |
|  |  |  |  |  |