

UNIT 1 (HIGHER TIER)

Applications Unit 1 June 2013 Higher Tier		Final
1.(a) 9cm, 8cm and 5cm lines in correct orientation 60°±2° constructed using the appropriate arcs 90°±2° by appropriate compasses construction	B1 B2 B2 5	±2mm on all lengths <i>No arcs no marks!</i> B1 for appropriate arcs but angle slightly outside the tolerance, or for at least one arc correct with the other slightly outside of tolerance together with angle attempted, or for full method clearly attempted B1 for appropriate arcs but angle slightly outside the tolerance, or for full method clearly attempted If no construction arcs shown, then B0 apart from first B1 for the lengths
2.(a) 223(°) ±2° (b) Indication of bearing from Palma 073° ±2° Indication of bearing from Alcudia 130° ±2° Arta indicated (by a cross or name) on the map (c) 6 cm ±2 mm measured 54÷6 or 9 (km) or 1cm: 9(km) (1cm :) 9000 (m) (d) 108 72 180 = 90 + z + 72, or z = x – 90, or z = 90 – y, or equivalent 18	B1 B1 B1 B1 B1 M1 A1 B1 B1 M1 A1 11	FT provided at least one correct bearing and Arta is on land FT 54÷ ‘their 6’. Accept method with incorrect place value FT y = 180 - x Provided x is obtuse and y is acute, and neither is 90° CAO
3(a) Value between 3 (metres) and 5 (metres) inclusive (b) Circle (intention) with radius 4 cm ± 2mm drawn	B1 B2 3	Accept a suitable sketch where clearly the branches are drawn to scale of 4cm ± 2mm Many branches (covering much of the region) shown within tolerance is sufficient – circumference may not be shown B1 for circle with radius other than 4cm ± 2mm, or suitable sketch with overall idea of 4cm ± 2mm radius, or a few branches shown within the tolerance
4(a) 8 mm (b) (i) Method, e.g. increase in L / increase in W e.g. 12/150 (= 0.08) (ii) Full explanation, e.g. ‘rate of change length with weight’, ‘for every 1g increase 0.08mm increase’ (c) Explanation, e.g. ‘no more data recorded’, ‘spring snaps’, ‘broken spring’, ‘spring now completely straight’, etc (d) L = 2W + 35	B2 M1 A1 E2 E1 B3 10	B1 for an answer of 8, or for an answer between 6 and 9 inclusive (excluding 8) with mm given Or idea of alternative complete method Accept sight of quotient based on misread of the scale for M1 only. Or alternative complete method with accurate values Mark final answer. E1 for mention of ‘rate of change’ without being specific, e.g. ‘1g gives 0.08mm’. Allow ‘length increases as weight increases’ for E1 only B2 for either of 2 or 35 correctly placed, or B1 for a correct interpretation of data given, e.g. sketch shows start (0,35) and end (100, 235)
5(a) 210÷30 (=7) 14, 56, 140 in this order (b) T = 15x (c) 8P/30 (= 4P/15)	M1 A2 B3 B2 8	OR using 1:4:10 to find 210÷15 (=14) A1 for any one answer correct, or for 14, 56 and 140 in an incorrect order B2 for (T=) x + 4x + 10x, or B1 for sight of 4x or 10x OR 4 and 10 Mark final answer. B1 for 8/30 or P÷30 or P/30 or from simplified ratio P÷15 or P/15 <i>If no marks, SCI for sight of ‘P = 3.75×variable’ or equivalent</i>
6.A uniform scale used (shown) at least 30 to 140 with idea of box-and-whisker plot AND with label ‘£’ Range of whiskers correct Lower and upper quartiles used as ends of the box Median shown correctly within the box	B1 B1 B1 B1 4	Award B4 for a correct response

10(a) 2^{-3} (b) $2^{0.12}$ (c) 2^9	B1 B1 B2 4	Accept $2^{12/100}$ or equivalent B1 for sight of $8^{12/4}$ or $8^{1/4 \times 12}$ or 8^3 or $(2^3)^3$ or $(2^3)^{1/4 \times 12}$ or equivalent <i>If a candidate writes only the index, penalise -1 once only on the first occasion</i>
11. Idea to find 4 areas of strip width $\frac{1}{2}$ hour $2 + 4.75 + 5 + 4$ 15.75 km	B1 M2 A1 U1 5	M1 for any 2 of the 4 areas correct, or '2 of their areas' correctly evaluated from an incorrect interpretation of the scale or of the $\frac{1}{2}$ strip requirement, e.g. use of 4 or 30 for the horizontal Other A marks are included by sight of 15.75 Only award A1 for correct calculation based on 4 strips to 14:00 Independent mark. Accept other units from appropriate calculations
12(a) Entries in frequency table: 32 and 28 Histogram: 12 to 16 f.d. 10 , 20 to 30 f.d. 2 (b) 8 (light bulbs) (c) Identifying that the answer is in the range >8 and ≤ 12 Realise need 8 of the 32 ($8 < t \leq 12$) or $1/4$ of the entry for $8 < t \leq 12$ (y =) 9 or 9 hundred hours or equivalent	B2 B2 B1 M1 M1 A1 8	B1 for each correct entry B1 for each correct bar Maybe shown on the histogram. FT from their 32 entry, provided it is >8 Maybe shown on the histogram. FT from their 32 entry, provided it is >8 CAO
13(a) Suitable strategy to find b, e.g. attempt to sketch or by some substitution Either $0 = -5^2 + b \times 5$ or $6.25 = -2.5^2 + b \times 2.5$ b = 5 $y = -x^2 + 5x$ (b) Method to find c, e.g. $0 = -6^2 + c \times 6$ c = 6 Use $y = -x^2 + 6x$ when $x = 3$ (Max height found) $y = 9$ (metres) Correct sketch with the 3(m across to max ht.) and 9(m height)	S1 M1 A1 A1 M1 A1 M1 A1 B1 9	Accept substitution with use of at least one of the values given but with incorrect interpretation Accept interpretation of $-x^2$ as $(-x)^2$ for M1 only FT their b provided M1 awarded Do not award previous 4 marks for a correct sketch based on spurious or incorrect working.