IGCSE

MARK SCHEME for the October/November 2014

0580 MATHEMATICS

0580/43 Paper 4 (Extended), maximum raw mark 130

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Abbreviations

cao correct answer only dep dependent

FT follow through after error isw ignore subsequent working oe or equivalent

SC Special Case

nfww not from wrong working soi seen or implied

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| Qu. | Answers | Mark | Part Marks |
| 1 (a) (i) (ii)  (iii) (b) | 5.37[1...]  54.1 or 54.11 to 54.12  65.8  263.2 or 263 | 2  3  2  3FT | 2 2 2  M1 for [AD = ] 2.6 + 4.7 oe or better  4.7  M2 for tan [BCD =] (17 − 11 − 2.6) oe  or  B1 for 3.4 seen  11 + 17  M1 for 2 × 4.7 oe  FT their (a)(iii) × 4 correctly evaluated   9.4 2  M2 for their (a)(iii) ×  4.7  oe     or   9.4 2  4.7 2  M1 for [scale factor =]  4.7  or  9.4  soi      |
| 2 (a) (i)  (ii) (b) | 920  8 *×* 7 [=805] oe  30.8 or 30.76 to 30.77  1211 final answer | 1  2  5 | 2990 *×* 7 [= 805]  26  8  M1 for (11 + 8 + 7) [× 100]  B4 for 13 926.5[0] [area A total sales]  or  B3 for 11 040 [area B] and 10 867.50 [area C] or  21 907.5 [area B + area C]  or  B2 for 11 040 [area B] or 10 867.50 [area C]  or  M1 for 736 [B tickets] and M1 for 483 [C tickets]  After 0 scored  SC2 for answer of 1196 or  SC1 for 13754 (A total sales) |

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| (c) | 37 720 | 3 | 35834  M2 for 0.95 oe  or  M1 for 35834 associated with 95[%] |
| 3 (a) (i) (ii)  (iii) (b) (i)  (ii) | 52  Angles in same segment  104  Angle at centre is twice angle at  circumference  34  Angle between tangent and radius  = 90°  7.65 to 7.651  49.3 or 49.33 to 49.34… | 1  1dep  1  1  1  1  4  3 | Accept same arc, same side of same chord  Accept double, 2 × but not middle, edge  Accept right angle, perpendicular  M2 for 8.92 + 72 – 2 × 8.9 × 7 × cos56 or  M1 for correct implicit formula and  A1 for 58.5 to 58.6  M2 for [sinBEC =] 7 sin 56 oe  their (b)(i)  or  M1 for sin 56 *=* sin BEC oe  their (b)(i) 7 |
| 4 (a) (i)  (ii) (iii)  (b) (i)  (ii) | Ariven with comparable form for both shown or difference between the two fractions shown  6  15 oe  7  15 oe  Completes tree diagram correctly  126  9   350 oe  25     | 1  2  3  3  2 | Accept probabilities changed to decimals or percentages (to 2sf or better)  3 2  M1 for 5 *×* 3  3 1 2 2 2 1  M2 for 5 × 3 + 5 × 3 oe 1 − their (a)(ii) − 5 × 3  or  3 1 2 2  M1 for 5 *×* 3 or 5 *×* 3 seen  B2 for 5 values correct or  B1 for 1 value correct  3 6 7  M1 for 5 × 7 × 10 |

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| (iii) | 344  350 oe | 3 | M2 for 1− their 2 × their 1 × their 3 oe  5 7 10  or 3 + 2 × 6 + 2 × 1 × 7  5 5 7 5 7 10  2 1 3  M1 for their 5 × their 7 × their 10 oe  or identifies the 7 routes  or attempt to add 7 probabilities with at least 5 correct  9 + 27 + 3 + 9 + 6 + 18 + 1 oe  25 175 50 350 25 175 25 |
| 5 (a) (i) (ii) (iii) (iv)  (b) |  0 − 4       4 0    − 1 1       1 − 1   − 1 0       0 − 1   − 13      5    1 2       0 1  | 1  1  2  2  3 | B1 for three correct elements  B1 for either correct in this form  M1 for understanding to find the inverse of Q   1 2   and M1 for det = 1 or for k   k*≠*0   0 1   Alternative   1 − 2  a b   1 0      =     0 1  c d   0 1   Leading to a – 2c = 1 and c = 0 then a = 1 and b – 2d = 1 and d = 1 then b = 2  M2 all four equations, M1 for a pair of correct equations |
| 6 (a) (i)  (ii) (iii) | *x8*  *3* final answer  7 3  15x y final answer  8  16x final answer | 1  2  2 | M1 for 2 elements correct  *k* 8  M1 for 16x or kx |

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*r*  *π* − 1

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| (b)  (c) |  [− ]7  2 − 4.3 −12 or better     and  p = [– –]7 and r = 2(3) oe  3.48, –1.15 cao  x *+ 5* 1 5  x *2* or x *+* x *2* final answer  nfww | B1  B1  B1B1  3 |  7 *2*  or for  *x* − 6   p + q p − q  Must see or or both  r r  7  7 *2*  or for 6 ± 4 +  6      After B0,  SC1 for answer 3.5 and –1.1  or 3.482… and –1.149 to –1.148 seen or for 3.48, –1.15 seen  or for answer –3.48 and 1.15  B1 for (x + 5)(x – 5)  and  2  B1 for x (x – 5) |
| 7 (a)  (b) (i)  (ii)  (c) (i)  (ii) | 1  2 × 8 × 8 × sin 56 oe  26.52 to 26.53  72.[0] or 71.87 to 72.0  21.1 or 21.2 or 21.14 to 21.17  30 2 1 2  360 × *π* × r − 2 × r × sin 30 oe  1 × *π* × r 2 − 1 × r 2  12 4  1 *2*  1   4  3   20.6 or 20.7 or 20.55 to 20.71 | M1  A1  3  3  M2  A1  A1  3 | or [½ × 2] 8sin28 × 8cos28 or [½ × 2] × 7.06… ×  3.75…  M2 for 26.5/( *π ×* 6.5*2* ) × 360 oe  x *2*  or M1 for 360 × π × 6.5 = 26.5 or better  M2 for their (b)(i) × π × 2 × 6.5 + 2 × 6.5 oe  360  or M1 for their (b)(i) × π × 2 × 6.5 oe or their (a)  360 0.5 *×* 6.5  30 2 1 2  M1 for 360 × *π* × r or 2 × r × sin 30  Dep on M2 A1 and no errors seen  2 5  M2 for [r =] 1 (1 *π −* 1)  4 3  or M1 for one correct rearrangement step to r  1 *2*  1   from 4 *r*  3 *π* − 1 = 5    |

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| 8 (a) (i) (ii)  (b) (i) (ii)  (iii) (c)  (d) (i)  (ii) | (1, 2)  y = 3x – 1 cao final answer  (x + 5)(x – 2) isw solutions  [a =] –5 [b =] 2  [c =] –10  x = –1.5  Inverted parabola  x-axis intercepts at –2 and 9  y-axis intercept at 18  p = 6  q = 43  –43 | 1+1  3  2  3FT  1FT B1  B2  B1  3  1FT | 8 − −4  M1 for gradient = 3 − −1 oe  and M1 for substituting (3, 8) or (–1, –4) into their y = 3x + c or for finding y-intercept is –1  SC1 for (x + a)(x + b) where ab = –10 or a + b = 3  B1FT for each of their 5 and their –2 from (b)(i)  and B1 for c = –10  FT x = (their (a + b))/2  B1 for each  After B0 allow SC1 for (9 – x)(2 + x) oe  2  B2 for (x + 6) – 43 or p = 6 or q = 43  2 2 2  or M1 for (x + 6) or x + px + px + p  and  2 2  M1 for –7 – (their 6) or p – q = –7 or 2p = 12  FT – their q |
| 9 (a) (i)  (ii) (b) (i)  (ii) (iii) | 7  17  64  40  1.6[0] | 4  1FT  2  2  2FT | 16 × 11 + 17 × 10 + 18 p + 19 × 4 + 20 × 8  M2 for 11 + 10 + 4 + 8 + = 17.7  p  or better or  M1 for sum of two correct products or better or for [total =] 11 + 10 + 4 + 8 + p  and  B1 for 582 + 18p = 17.7 (33 + p)  STRICT FT median for their p if integer  320  M1 for 6.4 × 1.28 oe  320  M1 for 480 × 60 oe  FT their (b)(i) / their (b)(ii) evaluated correctly to 2dp  480  M1 for their (b)(i) / their (b)(ii) or 6.4 × 1.28 ÷ 60 |

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| (c) | 9.9125 cao | 5 | B4 for answer 9912.5 or  M1 for 25 to 35 × 290 to 310 oe  and B1 for 32.5 used and B1 for 305 or 5 mins 5 secs used  and M1 indep for any correct conversion seen m to km |
| 10 (a) (i) (ii)  (b) | 5x + 14 final answer  14.2  8a – 3b + 14 = 32.5 or better  5a + 4b + 13.5 = 39.75 or better  Equates coefficients of either a or b  40a – 15b = 92.5  40a + 32b = 210 or  32a – 12b = 74  15a + 12b = 78.75  Adds or subtracts to eliminate  47b = 117.5  47a = 152.75  [a =] 3.25 [b =] 2.5 | 2  3  B1  B1  M1  M1  A1  A1 | M1 for 5x + k or kx + 14  M1 for 5x = 32 – 14 FT their expression in (a)(i) A1FT for x = 3.6  8a – 3b = 18.5  5a + 4b = 26.25  or rearranges one of their equations to make a or b the subject  e.g. a = 3b + 18.5  8  Dep on previous method  or correctly substitutes into the second equation  5(3b + 18.5 )  e.g. 8 + 4b = 26.25  After M0 scored  SC1 for 2 correct values with no working  or for two values that satisfy one of their original equations |

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