

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
GCE Ordinary Level

**MARK SCHEME for the May/June 2010 question paper
for the guidance of teachers**

4024 MATHEMATICS (SYLLABUS D)

4024/11 Paper 11, maximum raw mark 75

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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| Qu | Answers | Mark | Part Marks |
|-----------|---|-------------|--|
| 1 | (a) $\frac{13}{18}$ oe (b) $\frac{22}{27}$ oe | 1 1 | |
| 2 | (a) 9 (b) 12 | 1 1 | |
| 3 | (a) 63 (b) $\frac{28}{\pi}$ | 1 1 | |
| 4 | 64 | 2 | M1 for $(60 + 20) \div (\text{total time})$ |
| 5 | (a) C (b) (0)40° | 1 1 | |
| 6 | (a) $x < 3.5$ (b) 3 | 1 1ft | ft from their (a) |
| 7 | TRUE TRUE FALSE Valid Example | 2 | B1 for TRUE TRUE or FALSE with valid example evaluated |
| 8 | (a) 49 (b) 18 | 1 1 | |
| 9 | (a) 6.5 (b) 6 | 1 2 | B1 for 7.5 seen |
| 10 | (a) (0).012 (b) 300 (c) 3 cao | 1 1 1 | |
| 11 | Congruent triangles established and conclusion | 3 | M1 for CO = OD or AO = OB M1 for $A\hat{O}C = B\hat{O}D$ A1 for both pairs of equal sides, equal angles, a valid reason and conclusion |
| 12 | (a) 1.5 , 6.5 (b) $x \geq 0, y \geq 4, x \leq 3$ | 1 2 | C1 for two correct or all 3 inequalities consistently wrong, or = |

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| 13 | (a) (400 350) (b) <u>Total cost</u> (of each family's order). | 2 1 | C1 for 750 B1 for 400 or 350 seen |
| 14 | Correct histogram | 3 | B2 for three correct columns B1 for one correct column SC1 for correct frequency densities |
| 15 | (a) 40.81 (b) (i) 6.9(0) (ii) 2.76 | 1 1 2 | |
| 16 | (a) 6 8 13 (b) 17 cao | 3 1 | C2 for total 27 with their median 8 or C1 8 or total 27 or B1 for 27 seen or M1 for a relevant equation containing such as x and $x + 7$ or $y - 7$ and y |
| 17 | (a) $y = \frac{36}{x^2}$ (b) 9 cao (c) ± 6 cao | 2 1 1 | C1 for $y = \frac{k}{x^2}$ B1 for $k = 36$ seen M1 for $y = \frac{k}{x^2}$ seen with any k |
| 18 | (a) 50 (b) 65 (c) 45 (d) 225 | 1 1 1 1 | |
| 19 | (a) 78 (b) 1.62×10^{11} (c) $5.32(2) \times 10^{21}$ | 1 1 2 | C1 for figs 5322 or $5.3.... \times 10^{21}$ |
| 20 | (a) 4 : 25 (b) 2 : 5 (c) 7.5 | 1 1 2 | M1 for $\frac{3}{CD} = \frac{2}{5}$ or better |

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| 21 | (a) $22 - 3n$ (b) (i) $(2x - 5y)(2x + 5y)$ (ii) $(5a - 2)(x - a)$ | 2 1 2 | B1 for $-3n$ soi M1 for the correct extraction of a common factor at any stage |
| 22 | (a) Correct distance/time graph | 3 | B2 for any two correct lines or L_1 (10 10,0) to (a, 6), gradient m, L_2 (a, 6) to (b, 6) L_3 (b, 6) to (11 00,0) or (c, 0), gradient $-m$. B1 for a horizontal line at $d = 6$ or a horizontal line, 14 mins, anywhere or $\frac{6}{20}$ soi |
| | (b) (i) 10 48 (ii) 4 | 1 1 | |
| 23 | (a) (i) $t^2 - 4t + 3 = 0$ correctly derived AG (ii) 1, 3 | 1 2 | Must see $(20t - 5t^2) = 15$ C1 for one value correct , and no incorrect value given M1 for $(t - 1)(t - 3)$ oe seen |
| | (b) 4 | 2 | M1 for $20t - 5t^2 = 0$ or better seen |
| 24 | (a) (i) 0.75 oe (ii) $\frac{8}{15}$ oe (b) $x=2 \quad y=-3$ | 2 2 3 | M1 for $5 - 6x \pm 2 = 2x + 1$ soi M1 for $\frac{5t}{2} = \frac{4}{3}$ or better C2 for one correct www M1 for elimination or substitution reaching such as $11x = k$ or $hx = 22$ or $11y = p$ or $qy = -33$ |