



MATHEMATICS (SYLLABUS D)

4024/12

Paper 1

May/June 2016

MARK SCHEME

Maximum Mark: 80

Published

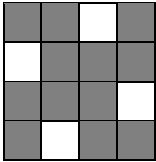
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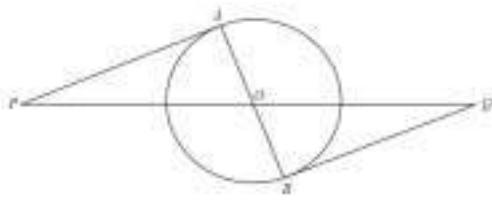
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|--------|-----------------------------------|----------|-------|
| Page 2 | Mark Scheme | Syllabus | Paper |
| | Cambridge O Level – May/June 2016 | 4024 | 12 |

| Question | Answers | Mark | Part marks |
|----------|---|------|---|
| 1 (a) | 0.69 | 1 | |
| (b) | $\frac{8}{15}$ oe | 1 | |
| 2 (a) | ... 2 ... 2 | 1 | |
| (b) |  | 1 | |
| 3 (a) | Ruled straight line through (0, 0) and (100, 56) | 1 | |
| (b) | 35 to 37 | 1 | |
| 4 | ... = 0.15 = 15[%] $\frac{5}{8} = 0.625 = \dots$ | 2 | C1 for two or three correct |
| 5 (a) | 9 | 1 | |
| (b) | -18 | 1 | |
| 6 (a) | $2^5 \times 3$ | 1* | |
| (b) | 72 | 1 | |
| 7 (a) | 1.5 [hours] or 90 [minutes] oe | 1 | |
| (b) | 20 35 | 1 | |
| 8 | 7.2 or $\frac{36}{5}$ oe | 2* | M1 for $20 = 10^2k$ oe or $\frac{20}{10^2} = \frac{y}{6^2}$ oe |
| 9 | 16 | 2* | B1 for 15, 8 and 11 correctly placed and 26 not placed in Venn diagram or for $x + 26 + 8 = 50$ oe or for $50 - 26 - 8$ oe leading to answer |
| 10 | $x = 0.5$ oe $y = -2$ | 2* | C1 for either x or y correct or for two values that fit one equation |
| 11 (a) | $\frac{x^4}{3y^3}$ | 1 | |
| (b) | $\frac{v^2}{2t}$ | 1 | |

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|--------|-----------------------------------|----------|-------|
| Page 3 | Mark Scheme | Syllabus | Paper |
| | Cambridge O Level – May/June 2016 | 4024 | 12 |

| Question | Answers | Mark | Part marks |
|---------------------------|---|------|---|
| 12 (a) (i) (ii) (b) | arc radius 3.5 cm, centre A | 1 | |
| | bisector of angle ACB | 1 | |
| | Correct region shaded | 1 | |
| 13 (a) (b) (i) (ii) | $27^0, \sqrt[3]{1000}, 5^2, 2^5$ | 1 | |
| | any value in range $4 < x < 9$ | 1 | |
| | any value in range $-1 < x < 0$ | 1 | |
| 14 (a) (b) | $(-4, 2)$ $(6, 2)$ | 1 | Both correct |
| | $(-3, -1)$ $(5, 5)$ | 2 | C1 for one correct or for two x -values or two y -values correct or for both $(4, 6)$ and $(-2, -2)$ |
| 15 (a) (b) | $x + y \leq 8$ oe $2y \geq x + 4$ oe $x \geq 0$ | 2 | C1 for two correct |
| | 3 | 1 | |
| 16 (a) (b) | 595 | 1 | |
| | 340 | 2* | M1 for 10×25.5 soi |
| 17 | 280, 295, 310 | 3* | C2 for two correct values OR B2 for two from $70^\circ, 40^\circ$ and 55° seen OR B1 for 70° seen or for 10° or 120° correctly positioned on diagram |
| 18 (a) (b) | 16 | 1 | |
| | 160 or $10 \times \textit{their (a)}$ | 2ft* | M1 for $0.5 \times \textit{their } v \times (8 + 12)$ oe or $0.5 \times \textit{their } v \times 4 + \textit{their } v \times 8$ oe |

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|--------|-----------------------------------|----------|-------|
| Page 4 | Mark Scheme | Syllabus | Paper |
| | Cambridge O Level – May/June 2016 | 4024 | 12 |

| Question | Answers | Mark | Part marks |
|----------|---|------|--|
| 19 | $\angle POA = \angle QOB$ vertically opposite $AO = OB$ equal radii $\angle PAO = \angle QBO = 90^\circ$ tangent perpendicular to radius  | 3* | B1 for two pairs of equal angles: $\angle POA = \angle QOB$ and $\angle PAO = \angle QBO$ or for one pair of angles and pair of sides: $\angle POA = \angle QOB$ or $\angle PAO = \angle QBO$ and $AO = OB$ AND B1 for a correct reason linked with a correct pair of angles/sides |
| 20 (a) | $\frac{2}{10}, \frac{2}{9}, \frac{8}{9}, \frac{1}{9}$ correctly positioned | 1 | |
| (b) (i) | $\frac{56}{90}$ oe | 1* | |
| (ii) | $\frac{32}{90}$ oe | 2ft* | M1 for $\frac{8}{10} \times \frac{2}{9} + \frac{2}{10} \times \frac{8}{9}$ ft <i>their</i> tree diagram with fractions < 1 |
| 21 (a) | $2x + 3$ oe | 1 | |
| (b) (i) | 7 | 1 | |
| (ii) | $\frac{8-2x}{3}$ oe final answer | 2* | B1 for $3x = 8 - 2y$ or $3y = 8 - 2x$ or $2x = 8 - 3y$ or $2y = 8 - 3x$ or $1.5x = 4 - y$ or $1.5y = 4 - x$ or $\frac{8-2x}{3}$ oe seen or $\frac{8-2y}{3}$ oe seen |
| 22 (a) | 1.8×10^8 cao | 2 | C1 for $1.7[\dots] \times 10^8$ or answer figs 18 |
| (b) | 5 | 1 | |
| (c) | 20 cao | 2* | C1 for answer figs 2 or answer 18 OR B1 for 4×10^7 oe and 2×10^6 oe seen |
| 23 (a) | Two correct bars drawn | 2 | C1 for rectangle base 0 to 10 height 2.8 or for rectangle base 30 to 60 height 0.6 |
| (b) | 12 | 1 | |
| (c) | $\frac{30}{150}$ oe or $\frac{18+m}{138+m}$ oe evaluated | 2ft* | B1 FT for fraction with numerator or denominator correct or for answer 20% or 0.2 |

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|--------|-----------------------------------|----------|-------|
| Page 5 | Mark Scheme | Syllabus | Paper |
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| Question | Answers | Mark | Part marks |
|------------|---------------------------------------|------|---|
| 24 (a) | 320 | 3* | M2 for $\frac{a}{360} \times \pi \times (3r)^2 = 8\pi r^2$ oe OR M1 for $\frac{a}{360} \times \pi \times (3r)^2$ oe seen or for $8\pi r^2$ seen |
| (b) | $6r + \frac{16\pi r}{3}$ final answer | 2* | C1 for $kr + \frac{16\pi r}{3}$, where $k \geq 0$ OR M1 FT for $\frac{their320}{360} \times 2\pi \times 3r$ oe or for $6r + \frac{their320}{360} \times n\pi r$ oe where n is a positive integer |
| 25 (a) (i) | -6 | 1 | |
| (ii) | 15 | 2* | C1 for $15^2 - 5 \times 15$ or for 15, -10 OR M1 for $(p + 10)(p - 15) [= 0]$ |
| (b) | 4 | 2* | B1 for $3 \times 5^2 - 5k = 55$ oe |
| 26 (a) | $\frac{3+4t}{t-1}$ oe | 3* | C2 for $\frac{7}{t-1}$ or $\frac{3-4t}{t-1}$ OR M1 for $t(p-4) = p+3$ or $pt-4t = p+3$ AND M1 for isolating p terms after fraction eliminated e.g. $pt-p = 3+4t$ or $p(t-1) = 3+4t$ |
| (b) | $\frac{2x-1}{x-5}$ final answer | 3* | B1 for $(2x+1)(2x-1)$ seen AND B1 for $(2x+1)(x-5)$ seen |