



MATHEMATICS

0580/22

Paper 2 (Extended)

October/November 2017

MARK SCHEME

Maximum Mark: 70

Published

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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 |

| Question | Answer | Marks | Partial marks |
|----------|---|-----------|--|
| 1 | - 3 | 1 | |
| 2 | [0].00517 | 1 | |
| 3 | $BC \ AB$ oe | 1 | |
| 4(a) | 2, 3, 4, 6 | 1 | |
| 4(b) | 27, 36 cao | 1 | |
| 5 | [x =] 60 [y =] 40 | 2 | B1 for each or for two numbers that add to 100 |
| 6 | 2.5 | 2 | B1 for 2200 or 0.055 seen or SC1 for answer figs 25 |
| 7 | 32 | 2 | M1 for $\frac{1}{2} \times 33 \times h = 528$ oe |
| 8 | 16.5 | 2 | M1 for $\frac{55}{60}$ or speed \times time (numerical) |
| 9 | 1.32×10^{41} | 2 | M1 for 0.12×10^{41} or 12×10^{40} or SC1 for figs 132 |
| 10 | 20.75 final answer cao | 2 | B1 for one of 5.15, 6.25 or 9.35 seen or M1 for $(5.2 - 0.05) + (6.3 - 0.05) + (9.4 - 0.05)$ |
| 11 | $48.\dot{4}\dot{8} \ -0.\dot{4}\dot{8}$ oe | M1 | SC1 for $\frac{48}{99}$ or $\frac{16}{33}$ or equivalent fraction with no/insufficient working |
| | $\frac{48}{99}$ or $\frac{16}{33}$ or equivalent fraction | A1 | |
| 12 | $15 + 2n - n^2$ final answer | 2 | M1 for three terms of $15 + 5n - 3n - n^2$ correct |

| Question | Answer | Marks | Partial marks |
|----------|---|-------|---|
| 13(a) | $3\frac{2}{3}$ cao | 1 | |
| 13(b) | $\frac{3}{12}$ [and $\frac{5}{12}$] oe | M1 | For correct method to find common denominator e.g. $\frac{12}{48}$ and $\frac{20}{48}$ |
| | $\frac{2}{3}$ cao | A1 | |
| 14 | -1, 0, 1, 2, 3 | 3 | B2 for $-2 < n \leq 3$ or list with one error or omission or M1 for $-5 + 1 < 2n$ or $2n \leq 5 + 1$ or a list with 3 correct and no more than 1 incorrect or if zero scored, SC1 for 5, 3, 1, -1, -3 |
| 15 | $\frac{y+x}{xy}$ final answer | 3 | B1 for $y(x+1) - x(y-1)$ B1 for common denominator xy or SC2 for $\frac{y-x}{xy}$ final answer |
| 16(a) | -1 | 1 | |
| 16(b) | $-6n + 29$ oe | 2 | M1 for $-6n + k$ (any k) or $-kn + 29$ ($k \neq 0$) |
| 17 | 60 | 3 | B2 for $x = 6$ or M1 for $29x + x = 180$ oe and M1 for $360 \div 6$ or $360 \div \text{their } x$ or $180(n - 2) = \text{their } x \times 29n$ |
| 18 | Correctly eliminating one variable | M1 | |
| | $[x =] \frac{2}{3}$ or 0.667 or 0.6666... | A1 | |
| | $[y =] \frac{1}{3}$ or 0.333 or 0.333... | A1 | If zero scored, SC1 for 2 values satisfying one of the original equations or if no working shown but 2 correct answers given |
| 19 | $[\pm] \sqrt{y^2 - 1}$ final answer | 3 | M1 for correct squaring M1 for correct rearranging for x or x^2 term M1 for correct square root |
| 20 | 132 | 3 | M2 for $\frac{1}{2}(7 + 15) \times 12$ or M1 for any correct area |

| Question | Answer | Marks | Partial marks |
|----------|---|-------|--|
| 21 | $\frac{1}{3}\mathbf{a} + \frac{2}{3}\mathbf{b}$ oe simplified | 3 | B2 for correct unsimplified vector for \overrightarrow{OK} in terms of \mathbf{a} and \mathbf{b} or M1 for a correct route for \overrightarrow{OK} or $\overrightarrow{AB} = -\mathbf{a} + \mathbf{b}$ or $\overrightarrow{BA} = -\mathbf{b} + \mathbf{a}$ or recognition of \overrightarrow{OK} as a position vector |
| 22 | [w =] 54 [x =] 126 [y =] 60 | 3 | B1 for [w =] 54 B1 for [x =] 126 If B0 B0 for first two B marks then B1 for <i>their w + their x = 180</i> B1 for [y =] 60 or for <i>their w + their x + their y = 240</i> |
| 23 | [k =] 3 [c =] 9 | 3 | M1 for $\frac{30}{360} \times \pi \times 6^2$ M1 for $\frac{1}{2} \times 6 \times 6 \times \sin 30$ |
| 24(a) | $\frac{5}{14}$ or 0.357 or 0.357... | 2 | M1 for $7 - 2 = 11n + 3n$ oe or better |
| 24(b) | 18 | 2 | M1 for $p - 3 = 3 \times 5$ or $\frac{p}{5} = 3 + \frac{3}{5}$ |
| 25(a) | $(x - 12)(x + 11)$ final answer | 2 | B1 for $(x + a)(x + b)$ where $ab = -132$ or $a + b = -1$ |
| 25(b) | $x(x + 2)(x - 2)$ final answer | 2 | B1 for $x(x^2 - 4)$ or $(x + 2)(x^2 - 2x)$ or $(x - 2)(x^2 + 2x)$ |
| 26 | 21.8 or 21.80... | 4 | M3 for $\tan = \frac{2}{\sqrt{3^2 + 4^2}}$ oe or M1 for $\sqrt{3^2 + 4^2}$ or $\sqrt{3^2 + 4^2 + 2^2}$ and M1 for recognising angle QAC |

| Question | Answer | Marks | Partial marks |
|----------|--|-------|---|
| 27(a) | 27 | 1 | |
| 27(b) | x^2 final answer | 1 | |
| 27(c) | $\frac{y^2}{2}$ or $0.5y^2$ final answer | 2 | M1 for $\left(\frac{y^6}{8}\right)^{\frac{1}{3}}$ or $\left(\frac{2}{y^2}\right)^{-1}$ or better or SC1 for answer $\frac{y^2}{c}$ or $\frac{y^k}{2}$ or $\frac{2}{y^2}$ |