# r/IGCSE Resources

## Topical Worksheets for Cambridge IGCSE™ Mathematics (0580/0980)

**Functions**

**Mark Scheme**

1st edition, for examination until 2025

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 1 | $\frac{3x+1}{5}$ | **3** | | **M2** for $x = \frac{3y+1}{5}$, $5y = 3x + 1$ or $y - \frac{1}{5} = \frac{3x}{5}$<br>**M1** for $x = \frac{5y-1}{3}$, $3y = 5x - 1$ or $y + \frac{1}{3} = \frac{5x}{3}$ | |
| 2(a) | 19 | **2** | | **M1** for $3\,(2^x) - 5$ soi or for f $(8)$ | |
| 2(b) | $\frac{x+5}{3}$ oe final answer | **2** | | **M1** for correct first step $y + 5 = 3x$ or $\frac{y}{3} = x - \frac{5}{3}$ or $x = 3y - 5$ | |
| 3 | $[p =]\ -13$ | **2** | | **M1** for $4\,(5x - 4) + 3$ or better | |
| 4 | $5 - 2x$ final answer | **2** | | **M1** for $2(1 - x) + 3$ oe | |
| 5(a) | 82 | **2** | | **M1** for $(3^x)^2 + 1$ soi by $\left(3^2\right)^2 + 1$ or g(9) isw | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 5(b) | $\frac{x+2}{7}$ final answer | **2** | | **M1** for $y + 2 = 7x$<br>or $\frac{y}{7} = x - \frac{2}{7}$<br>or $x = 7y - 2$ | |
| 5(c) | $[a =]$ 1, $[b =]$ 2, $[c =]$ 2 | **3** | | **B2** for<br>$x^4 + x^2 + x^2 + 1 + 1$<br>or **M1** for $\left(x^2 + 1\right)^2 + 1$ | |
| 5(d) | $\frac{6}{7}$ oe | **3** | | **M2** for $7x - 2 = 4$<br>or **M1** for $3^x = 81$ soi<br>f($x$) = 4<br>or for $3^{7x-2} = 81$ or better | |
| 6(a) | −3 | **1** | | | |
| 6(b) | $\frac{12}{11}$ oe | **2** | | **M1** for $\frac{3}{\frac{3}{x+2} + 2}$ soi | |
| 6(c) | $64x - 45$ final answer | **2** | | **M1** for<br>$8\,(8x - 5) - 5$ isw | |
| 6(d) | $\frac{x+5}{8}$ oe final answer | **2** | | **M1** for a correct first step<br>$y + 5 = 8x$, $\frac{y}{8} = x - \frac{5}{8}$<br>or $x = 8y - 5$ | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 6(e) | $\frac{8x^2 + 11x - 13}{x + 2}$ final answer | **3** | | **M1** for $(8x - 5)(x + 2) - 3$ oe isw<br>**B1** for common denominator $(x + 2)$ | |
| 6(f)(i) | **M1** for $(8x - 5)^2 + 6 = 19$<br>**B1** for $64x^2 - 40x - 40x + 25$<br>**A1** for $64x^2 - 40x - 40x + 25 + 6 = 19$ oe leading to $16x^2 - 20x + 3 = 0$ | **3** | | with no errors and must show $(8x - 5)^2 + 6 = 19$ with no omissions after this | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 6(f)(ii) | **B2** for $\frac{[--]20 \pm \sqrt{([-]20)^2 - 4\,(16)\,(3)}}{2 \times 16}$ oe<br><br>**B2** for 0.17 and 1.08 final ans | **4** | | **B1** for $\sqrt{([-]20)^2 - 4\,(16)\,(3)}$ or better<br>or **B1** for $\frac{[--]20 + \sqrt{q}}{2\,(16)}$ oe or $\frac{[--]20 - \sqrt{q}}{2\,(16)}$<br><br>**B1** for each<br>If 0 scored, **SC1** for answer 0.2 and 1.1 or answer − 0.17 and −1.08 or 0.174... and 1.075 to 1.076 seen or 0.17 and 1.08 seen in working | |
| 7(a) | 27 | **2** | | **M1** for $3^{3x}$ seen | |
| 7(b) | 3 | **2** | | **M1** for $7 + 3x = 2^4$ | |
| 7(c) | $\frac{x-7}{3}$ oe final answer | **2** | | **M1** for $x = 7 + 3y$ or $y - 7 = 3x$ or $-3x = 7 - y$ or $\frac{y}{3} = \frac{7}{3} + x$ | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 8 | 5 | **2** | | **M1** for $a \times (-2)^2 + 1 = 21$ | |
| 9(a) | $5x^3 + 2$ final answer | **1** | | | |
| 9(b) | $\frac{x-2}{5}$ final answer | **2** | | **M1** for correct first step e.g. $y - 2 = 5x$, $x = 5y + 2$, $\frac{y}{5} = x + \frac{2}{5}$ | |
| 10(a) | 0 | **1** | | | |
| 10(b) | 5 | **2** | | **M1** for $3\,(3^x) + 4$ or better or f $\left(\frac{1}{3}\right)$ or f $\left(3^{-1}\right)$ | |
| 10(c) | $\frac{x+1}{2}$ oe final answer | **2** | | **M1** for $x = 2y - 1$ or $y + 1 = 2x$ or $\frac{y}{2} = x - \frac{1}{2}$ or better | |
| 10(d) | $9x + 16$ | **2** | | **M1** for $3\,(3x + 4) + 4$ oe | |
| 10(e) | $9x^2 + 24x + 16$ | **2** | | **B1** for three terms from $9x^2 + 12x + 12x + 16$ correct | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 10(f) | 27 | **2** | | **M1** for $x = \text{h}(\textit{their}\ \text{g}(2))$ | |
| 11(a) | $-17$ | **2** | | **M1** for f(11) seen or $5 - 2(5 - 2x)$ or better | |
| 11(b)(i) | $4x^2 + 8$ oe | **1** | | | |
| 11(b)(ii) | $\frac{5-x}{2}$ oe final answer | **2** | | **M1** for $x = 5 - 2y$ or $2x = 5 - y$ or $y - 5 = -2x$ or $\frac{y}{2} = \frac{5}{2} - x$ | |
| 12(a) | 26 | **2** | | **M1** for g(5) or for $\left(x^2 + 1\right)^2 + 1$ | |
| 12(b) | $x^2 + 4x + 5$ | **2** | | **M1** for $(x + 2)^2 + 1$ | |
| 12(c) | 5 | **2** | | **M1** for $2x - 3 = 7$ | |
| 12(d) | $\frac{x+3}{2}$ oe | **2** | | **M1** for $x = 2y - 3$ or $y + 3 = 2x$ or $\frac{y}{2} = x - \frac{3}{2}$ oe | |
| 13(a) | 1 | **2** | | **M1** for h(0) or for $2^{8-3x}$ | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 13(b) | 8 | **2** | | **M1** for g(¼) or for $\frac{10}{2^x + 1}$ | |
| 13(c) | $\frac{10 - x}{x}$ or $\frac{10}{x} - 1$ final answer | **3** | | **M2** for $x = \frac{10 - y}{y}$ or better<br>or $xy = 10 - x$ or better<br>or $y + 1 = \frac{10}{x}$<br>or **M1** for $x(y + 1) = 10$<br>or $y(x + 1) = 10$<br>or $x = \frac{10}{y + 1}$<br>or $x + 1 = \frac{10}{y}$ | |
| 13(d) | 5 | **1** | | | |
| 14(a) | 2 | **2** | | **M1** for f(5)<br>or 7− (7 − $x$) or better | |
| 14(b) | 30 − 4$x$ final answer | **2** | | **M1** for 4(7 − $x$) + 2 or better<br>or for correct answer then spoilt | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 14(c) | $15 - 4x^2$ final answer | **2** | | **M1** for $15 - (2x)^2$ or better<br>or for correct answer then spoilt | |
| 15(a) | [0].70 cao | **2** | | **B1** for [0].696 to [0].697 | |
| 15(b) | 4 cao | **1** | | | |
| 16(a) | $9x^2$ | **1** | | | |
| 16(b) | $\frac{x-5}{3}$ | **2** | | **M1** for correct first algebraic step e.g.<br>$y - 5 = 3x$ or $\frac{y}{3} = x + \frac{5}{3}$ or better<br>or<br>for interchanging $x$ and $y$, e.g. $x = 3y + 5$, this does not need to be the first step | |
| 16(c) | $9x + 20$ cao final answer | **2** | | **M1** for $3(3x + 5) + 5$ | |
| 17(a) | $-13$ | **1** | | | |
| 17(b) | $-3x - 1$ or $5 - 3(x + 2)$ | **1** | | | |

| Question | Answer | Marks | AO Element | Notes | Guidance |
|---|---|---|---|---|---|
| 17(c) | $9x - 10$ cao | **2** | | **M1** for $5 - 3(5 - 3x)$ | |
| 17(d) | $\frac{5 - x}{3}$ final answer oe | **2** | | **M1** for correct first step e.g.<br>$y + 3x = 5$ or $\frac{y}{3} = \frac{5}{3} - x$ or $y - 5 = -3x$ or better<br><br>or<br>for interchanging $x$ and $y$, e.g. $x = 5 - 3y$, this does not need to be the first step | |
| | | | | | [Total: 101] |

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**Acknowledgements and Information:**

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