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 $y - \frac{1}{5} = \frac{3x}{5}$ **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 $y + 2 = 7x$ or $\frac{y}{7} = x - \frac{2}{7}$ or $x = 7y - 2$	
5(c)	$[a =]$ 1, $[b =]$ 2, $[c =]$ 2	**3**		**B2** for $x^4 + x^2 + x^2 + 1 + 1$ or **M1** for $\left(x^2 + 1\right)^2 + 1$	
5(d)	$\frac{6}{7}$ oe	**3**		**M2** for $7x - 2 = 4$ or **M1** for $3^x = 81$ soi f(x) = 4 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 $8\,(8x - 5) - 5$ isw	
6(d)	$\frac{x+5}{8}$ oe final answer	**2**		**M1** for a correct first step $y + 5 = 8x$, $\frac{y}{8} = x - \frac{5}{8}$ or $x = 8y - 5$	

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6(e)	$\frac{8x^2 + 11x - 13}{x + 2}$ final answer	**3**		**M1** for $(8x - 5)(x + 2) - 3$ oe isw **B1** for common denominator $(x + 2)$	
6(f)(i)	**M1** for $(8x - 5)^2 + 6 = 19$ **B1** for $64x^2 - 40x - 40x + 25$ **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 **B2** for 0.17 and 1.08 final ans	**4**		**B1** for $\sqrt{([-]20)^2 - 4\,(16)\,(3)}$ or better or **B1** for $\frac{[--]20 + \sqrt{q}}{2\,(16)}$ oe or $\frac{[--]20 - \sqrt{q}}{2\,(16)}$ **B1** for each 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 $\frac{y}{3} = \frac{7}{3} + x$	

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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	

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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}	

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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 or $xy = 10 - x$ or better or $y + 1 = \frac{10}{x}$ or **M1** for $x(y + 1) = 10$ or $y(x + 1) = 10$ or $x = \frac{10}{y + 1}$ or $x + 1 = \frac{10}{y}$	
13(d)	5	**1**			
14(a)	2	**2**		**M1** for f(5) or 7− (7 − x) or better	
14(b)	30 − 4x final answer	**2**		**M1** for 4(7 − x) + 2 or better or for correct answer then spoilt	

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14(c)	$15 - 4x^2$ final answer	**2**		**M1** for $15 - (2x)^2$ or better 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. $y - 5 = 3x$ or $\frac{y}{3} = x + \frac{5}{3}$ or better or 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**			

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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. $y + 3x = 5$ or $\frac{y}{3} = \frac{5}{3} - x$ or $y - 5 = -3x$ or better or for interchanging x and y, e.g. $x = 5 - 3y$, this does not need to be the first step	
					[Total: 101]