8. $\log_6 x + \log_6 (x+5) = 2\log_6 6$

$$\log_6 x(x+5) = \log_6 6^2$$

$$x^2 + 5x = 36$$

$$x^2 + 5x - 36 = 0$$

$$(x+9)(x-4)$$

$x = \cancel{-9}$ $x = 4$

Question			Generic Scheme	Illustrative Scheme	Max Mark
8.			**Method 1**	**Method 1**	4
			•¹ apply $\log_6 x + \log_6 y = \log_6 xy$	•¹ $\log_6 \left(x(x+5)\right) = \ldots$	
			•² write in exponential form	•² $x(x+5) = 6^2$	
			•³ express in standard quadratic form	•³ $x^2 + 5x - 36 = 0$	
			•⁴ solve quadratic and state solution of log equation	•⁴ $-9,\ 4$ and $x > 0 \Rightarrow x = 4$	
			Method 2	**Method 2**	
			•¹ apply $\log_6 x + \log_6 y = \log_6 xy$	•¹ $\log_6 \left(x(x+5)\right) = \ldots$	
			•² apply $m\log_6 x = \log_6 x^m$	•² $\ldots = \log_6 6^2$	
			•³ express in standard quadratic form	•³ $x^2 + 5x - 36 = 0$	
			•⁴ solve quadratic and state solution of log equation	•⁴ $-9,\ 4$ and $x > 0 \Rightarrow x = 4$	

Notes:

1. Accept $\log_6 x(x+5) = \ldots$ for $\bullet^1$.
2. $\bullet^2$ is not available for $x(x+5) = 2^6$; however candidates may still gain $\bullet^3$ and $\bullet^4$.
3. $\bullet^3$ and $\bullet^4$ are only available if the quadratic reached at $\bullet^3$ is obtained by applying the rules in $\bullet^1$ and $\bullet^2$.
4. $\bullet^4$ is only available for solving a polynomial of degree two or higher.
5. At $\bullet^4$, accept any indication that -9 has been discarded. For example, scoring out $x = -9$ or underlining $x = 4$.

Commonly Observed Responses:

Candidate A		**Candidate B**	
$\log_6 \left(x(x+5)\right) = 2$	$\bullet^1$ ✓	$\log_6 \left(x(x+5)\right) = 2$	$\bullet^1$ ✓
$x(x+5) = 12$	$\bullet^2$ ✗	$x(x+5) = 64$	$\bullet^2$ ✗
$x^2 + 5x - 12 = 0$	$\bullet^3$ $\boxed{✓ 1}$	$x^2 + 5x - 64 = 0$	$\bullet^3$ $\boxed{✓ 1}$
$\frac{-5 \pm \sqrt{73}}{2}$ and $x > 0 \Rightarrow x = \frac{-5 + \sqrt{73}}{2}$	$\bullet^4$ $\boxed{✓ 1}$	$\frac{-5 \pm \sqrt{281}}{2}$ and $x > 0 \Rightarrow x = \frac{-5 + \sqrt{281}}{2}$	$\bullet^4$ $\boxed{✓ 1}$