Question	Scheme	Marks	AOs
9(a)	f is a many-to-one function.	B1	2.4
		(1)	
(b)	$k = 7$	B1	2.2a
		(1)	
(c)	$(x-7)^2 + 5 = x$ $x^2 - 15x + 54 = 0$	M1	1.1b
	$x^2 - 15x + 54 = 0 \Rightarrow x = ...$	dM1	1.1b
	$7 \leqslant k \leqslant 9$	A1	2.1
		(3)	
(d)	$y = (x-7)^2 + 5 \Rightarrow y - 5 = (x-7)^2$ $x - 7 = \sqrt{y-5}$ $x = \sqrt{y-5} + 7$	M1	1.1b
	$g^{-1}(x) = \sqrt{x-5} + 7$	A1	1.1b
	$x \geqslant 5$	B1	2.5
		(3)	
			(8 marks)

Notes:

(a)

B1: Either "f is a many-to-one {function}" or "f is not a one-to-one {function}"

(b)

B1: Deduces $k = 7$

(c)

M1: Attempts to set $(x-7)^2 + 5 = x$ and rearrange their equation to a 3TQ = 0

dM1: Attempts to solve for x using an appropriate method, which may be by calculator.

A1: cao $7 \leqslant k \leqslant 9$

(d)

M1: Attempts to make x or swapped y the subject of the formula. The order of operations should be correct but condone slips, i.e., $x = \sqrt{y \pm 5} \pm 7$ or $y = \sqrt{x \pm 5} \pm 7$

A1: cao $g^{-1}(x) = \sqrt{x-5} + 7$

May be found by simply using inverse operations, which is acceptable for both marks.

B1: Correct domain $x \geqslant 5$