

Question	Scheme	Marks	AOs	
<b>5(a)(i)</b>	$fg(4) = f(2+3(4)-4^2) = f(-2) = \dots$	M1	1.1b	
	$= \frac{2k}{5}$	A1	1.1b	
	<b>(ii)</b>	$y \in \mathbb{R}, y \neq \frac{k}{2}$	B1	2.2a
	<b>(iii)</b>	$y = \frac{kx}{2x-1} \Rightarrow 2xy - y = kx \Rightarrow x(2y-k) = y$	M1	2.1
		$f^{-1}(x) = \frac{x}{2x-k}$	A1	2.5
		$x \neq \frac{k}{2}$	B1ft	2.5
		<b>(6)</b>		
<b>(b)</b>	$f^{-1}(2) = \frac{11}{3g(2)} \Rightarrow \frac{2}{4-k} = \frac{11}{3(4)} \Rightarrow k = \dots$	M1	3.1a	
	$24 = 44 - 11k \Rightarrow k = \frac{20}{11}$	A1	1.1b	
	<b>(2)</b>			
	<b>(b) Alternative:</b>			
	$f^{-1}(2) = \frac{11}{3g(2)} \Rightarrow f\left(\frac{11}{3g(2)}\right) = 2 \Rightarrow f\left(\frac{11}{12}\right) \Rightarrow k = \dots$	M1	3.1a	
	$\frac{11}{10}k = 2 \Rightarrow k = \frac{20}{11}$	A1	1.1b	

**(8 marks)****Notes****(a)(i)**M1: Full method to find  $g(4)$  and substitute the result into  $f$ . Also allow for an attempt to substitute  $x = 4$  into an attempt at  $fg(x)$ .

A1: Correct expression

**(ii)**B1: Correct range (Allow  $x \in \mathbb{R}, x \neq \frac{k}{2}$ )**(iii)**M1: Correct attempt to cross multiply followed by an attempt to factorise out  $x$ .A1: Correct expression using the correct notation. Allow  $f^{-1} = \dots$  or  $f^{-1}: x \rightarrow \dots$  but not  $y = \dots$ 

B1ft: The correct domain or follow through their answer to (ii).

**(b)**M1: A complete strategy to find  $k$ .

A1: Deduces the correct exact value