

2008 PI	<p>17. A function f is given by $f(x) = \sqrt{9 - x^2}$.</p> <p>What is a suitable domain of f?</p> <p>A $x \geq 3$ B $x \leq 3$ C $-3 \leq x \leq 3$ D $-9 \leq x \leq 9$</p>	2
Ans	C	
2008 PI	<p>23. Functions f, g and h are defined on suitable domains by</p> $f(x) = x^2 - x + 10, g(x) = 5 - x \text{ and } h(x) = \log_2 x.$ <p>(a) Find expressions for $h(f(x))$ and $h(g(x))$.</p>	3
Ans	<p>(a) $h(f(x)) = \log_2(x^2 - x + 10)$ $h(g(x)) = \log_2(5 - x)$</p>	
2007 PI	<p>3. Functions f and g, defined on suitable domains, are given by $f(x) = x^2 + 1$ and $g(x) = 1 - 2x$.</p> <p>Find:</p> <p>(a) $g(f(x))$; (b) $g(g(x))$.</p>	2 2
Ans	<p>(a) $g(f(x)) = -2x^2 - 1$ (b) $g(g(x)) = 4x - 1$</p>	
2006 PI	<p>3. Two functions f and g are defined by $f(x) = 2x + 3$ and $g(x) = 2x - 3$, where x is a real number.</p> <p>(a) Find expressions for:</p> <p>(i) $f(g(x))$; (ii) $g(f(x))$.</p> <p>(b) Determine the least possible value of the product $f(g(x)) \times g(f(x))$.</p>	3 2
Ans	<p>(a) $f(g(x)) = 2(2x - 3) + 3$ $g(f(x)) = 2(2x + 3) - 3$ (b) $16x^2 - 9$ minimum value = -9</p>	

2005 PI	<p>4. Functions $f(x) = 3x - 1$ and $g(x) = x^2 + 7$ are defined on the set of real numbers.</p> <p>(a) Find $h(x)$ where $h(x) = g(f(x))$.</p> <p>(b) (i) Write down the coordinates of the minimum turning point of $y = h(x)$.</p> <p>(ii) Hence state the range of the function h.</p>	2
Ans	<p>(a) $(3x - 1)^2 + 7$</p> <p>(b) (i) $\left(\frac{1}{3}, 7\right)$</p> <p>(ii) $y \geq 7$</p>	
2003 PI	<p>9. Functions $f(x) = \frac{1}{x - 4}$ and $g(x) = 2x + 3$ are defined on suitable domains.</p> <p>(a) Find an expression for $h(x)$ where $h(x) = f(g(x))$.</p> <p>(b) Write down any restriction on the domain of h.</p>	2 1
Ans	<p>(a) $\frac{1}{2x - 1}$</p> <p>(b) $x \neq \frac{1}{2}$</p>	
2002W PI	<p>9. The function f, defined on a suitable domain, is given by $f(x) = \frac{3}{x + 1}$.</p> <p>(a) Find an expression for $h(x)$ where $h(x) = f(f(x))$, giving your answer as a fraction in its simplest form.</p> <p>(b) Describe any restriction on the domain of h.</p>	3 1
Ans	<p>(a) $\frac{3(x + 1)}{x + 4}$</p> <p>(b) $x \neq -4$</p>	
2002 PI	<p>3. Functions f and g are defined on suitable domains by $f(x) = \sin(x^\circ)$ and $g(x) = 2x$.</p> <p>(a) Find expressions for:</p> <p>(i) $f(g(x))$;</p> <p>(ii) $g(f(x))$.</p>	2
Ans	<p>(a) (i) $\sin(2x^\circ)$</p> <p>(ii) $2 \sin(x^\circ)$</p>	
2001 PI	<p>7. Functions $f(x) = \sin x$, $g(x) = \cos x$ and $h(x) = x + \frac{\pi}{4}$ are defined on a suitable set of real numbers.</p> <p>(a) Find expressions for:</p> <p>(i) $f(h(x))$;</p> <p>(ii) $g(h(x))$.</p>	2
Ans	<p>(a) (i) $\sin\left(x + \frac{\pi}{4}\right)$;</p> <p>(ii) $\cos\left(x + \frac{\pi}{4}\right)$</p>	

<i>2000 P2</i>	<p>3. $f(x) = 3 - x$ and $g(x) = \frac{3}{x}$, $x \neq 0$.</p> <p>(a) Find $p(x)$ where $p(x) = f(g(x))$.</p> <p>(b) If $q(x) = \frac{3}{3-x}$, $x \neq 3$, find $p(q(x))$ in its simplest form.</p>	2 3
<i>Ans</i>	<p>(a) $3 - \frac{3}{x}$</p> <p>(b) x</p>	
<i>Specimen 2 P1</i>	<p>8. Functions f and g are defined on the set of real numbers by</p> $f(x) = x - 1$ $g(x) = x^2.$ <p>(a) Find formulae for</p> <p>(i) $f(g(x))$</p> <p>(ii) $g(f(x))$.</p>	3
	<p>(a) $f(g(x)) = x^2 - 1$, $g(f(x)) = (x - 1)^2$</p>	