

Question			Answer	Marks	AO	Guidance		
4	(i)	(a)	$fg(x) = f(x^2 + 2) = (x^2 + 2)^3$	B1 [1]	1.1	E		
4	(i)	(b)	$gf(x) = g(x^3) = (x^3)^2 + 2(= x^6 + 2)$	B1 [1]	1.1	E	No simplification required	
4	(ii)		<p><b>DR</b></p> $(x^2 + 2)^3 = (x^2)^3 + 3(x^2)^2(2) + 3(x^2)(2)^2 + 2^3$ $fg(x) = x^6 + 6x^4 + 12x^2 + 8$ $fg(x) - gf(x) = 24 \Rightarrow 6x^4 + 12x^2 - 18 = 0$ $x^4 + 2x^2 - 3 = 0 \Rightarrow (x^2 - 1)(x^2 + 3) = 0$ $x^2 + 3 = 0 \text{ has no real solutions}$ $x^2 - 1 = 0 \Rightarrow x = \pm 1$	<p>M1</p> <p>A1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>A1</p> <p>[6]</p>	<p>1.1</p> <p>1.1</p> <p>2.1</p> <p>1.1</p> <p>2.4</p> <p>2.2a</p>	<p>E</p> <p>C</p> <p>C</p> <p>C</p> <p>A</p> <p>A</p>	<p>Binomial expansion of their <math>(x^2 + 2)^3</math> - correct powers and coefficients</p> <p>Correct method for solving their quadratic in <math>x^2</math></p> <p><math>x^2 + 3 \neq 0</math> is acceptable for this mark</p>	<p>Allow one slip</p> <p>If M0 next two marks become B marks</p>