

1. i. Simplify  $(x + 4)(5x - 3) - 3(x - 2)^2$ .

[3]

ii. The coefficient of  $x^2$  in the expansion of

$$(x + 3)(x + k)(2x - 5)$$

is  $-3$ . Find the value of the constant  $k$ .

[3]

2. i. Simplify  $(2x - 3)^2 - 2(3 - x)^2$ .

[2]

ii. Find the coefficient of  $x^3$  in the expansion of  $(3x^2 - 3x + 4)(5 - 2x - x^3)$ .

[2]

END OF QUESTION paper

# Mark scheme

Question		Answer/Indicative content	Marks	Part marks and guidance	
1	i	$5x^2 + 17x - 12 - 3(x^2 - 4x + 4)$	M1	Attempt to expand both pairs of brackets	
	i		A1	$5x^2 + 17x - 12$ and $x^2 - 4x + 4$ so; may be unsimplified, no more than one incorrect term, no "extra" terms at all. No "invisible brackets" $2x^2 + 29x - 24$	
	i	$= 2x^2 + 29x - 24$	A1	<b>Examiner's Comments</b>  Most candidates secured two marks for this question by accurately multiplying out both pairs of brackets. Common errors included multiplying both expressions instead of subtracting them and errors in dealing with negative coefficients. Only about 60% secured all the marks for this relatively simple algebraic manipulation.	
				<b>ISW</b> if they then put expression equal to zero and go on to "solve"	
	ii	$-5x^2 + 2kx^2 + 6x^2$	M1	Correct method to multiply out 3 brackets or correctly identify all $x^2$ terms	No more than 8 terms, but ignore sign errors / accuracy of non $x^2$ terms
	ii		A1	All $x^2$ terms correct, no extras	
	ii	$k = -2$	A1	<b>Examiner's Comments</b>  This question was generally approached very well, either by multiplying out all three brackets or more efficiently identifying only the $x^2$ terms. Again, errors with signs and errors in simplification, such as $2kx^2 + x^2 = 3kx^2$ , were seen regularly. Several other candidates did not proceed at all after their expansions. Seemingly they were unaware of how to use the information regarding the coefficient given in the question; often they substituted $-3$ for $x^2$ . Around half of candidates presented fully correct solutions.	
		<b>Total</b>	<b>6</b>		

2	i	$4x^2 - 12x + 9 - 2(9 - 6x + x^2)$	M1	Square to get at least one 3/4 term quadratic	<p><b>ISW</b> after correct answer</p> <p><b>Examiner's Comments</b></p> <p>Almost all the candidates secured the first mark for expanding one of the quadratic expressions correctly; the vast majority also simplified accurately. There were, however, a number of errors in dealing with the negative coefficients of the second expression so that only about three-quarters of candidates secured both marks. Some went on to "solve", which for this starter question was ignored.</p>
	i	$2x^2 - 9$	A1	Fully correct <b>www</b>	
	ii	$-6x^3 - 4x^3$	B1	$-6x^3$ <b>or</b> $-4x^3$ soi <b>www</b> in these terms	<p>Ignore other terms</p> <p>If only embedded in full expansion then award <b>B1B0</b></p> <p><b>Examiner's Comments</b></p> <p>Although some candidates chose to multiply out the given expressions fully, many candidates successfully identified just the terms necessary to give <math>x^3</math> and saved themselves a lot of effort. This was largely done accurately, more successfully than the first part, and although sign errors occurred both in the individual terms and in combining with e.g. <math>-6 - 4 = 10</math> fairly regularly seen.</p>
	ii	$-10$	B1	Condone $-10x^3$	
		<b>Total</b>	<b>4</b>		