5a) i) $(3x+5)^2 - 2 = 9x^2 + 30x + 25 - 2 = 9x^2 + 30x + 23$

ii) $3(x^2 - 2) + 5 = 3x^2 - 6 + 5 = 3x^2 - 1$

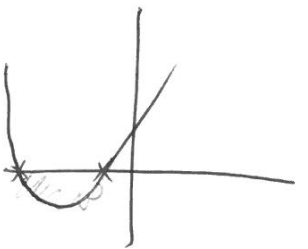
b) $9x^2 + 30x + 23 < 3x^2 - 1$

$6x^2 + 30x + 24 < 0$

$6(x^2 + 5x + 4) < 0$

$(x+4)(x+1)$

$x = -4 \quad x = -1$



$-4 < x < -1$

Question			Generic scheme	Illustrative scheme	Max mark
5.	(a)	(i)	•[1] interpret notation •[2] state expression for $f\left(g\left(x\right)\right)$	•[1] $f\left(3x+5\right)$ or $\left(g\left(x\right)\right)^2-2$ •[2] $\left(3x+5\right)^2-2$	**2**
		(ii)	•[3] state expression for $g\left(f\left(x\right)\right)$	•[3] $3\left(x^2-2\right)+5$	**1**
Notes:					
1. For $f\left(g\left(x\right)\right)=\left(3x+5\right)^2-2$ without working, award both •[1] and •[2].					
Commonly Observed Responses:					
Candidate A (a)(i) $f\left(g\left(x\right)\right)=3\left(x^2-2\right)+5$ •[1] ✖ •[2] ✓ 1 (a)(ii) $g\left(f\left(x\right)\right)=\left(3x+5\right)^2-2$ •[3] ✓ 1					

Question			Generic scheme	Illustrative scheme	Max mark
5.	(b)		$\bullet^4$ interpret information and expand $\bullet^5$ express inequality in standard quadratic form $\bullet^6$ determine zeros of quadratic equation $\bullet^7$ state range with justification	$\bullet^4$ $9x^2+30x+25-2<3x^2-6+5$ $\bullet^5$ $6x^2+30x+24<0$ $\bullet^6$ $-4,\ -1$ $\bullet^7$ $-4<x<-1$ with eg sketch or table of signs	**4**

Notes:

2. Candidates who do not work with an inequation from the outset lose $\bullet^4$, $\bullet^5$ and $\bullet^7$. However, $\bullet^6$ is still available. See Candidate D.
3. Accept the appearance of $-4,-1$ within inequalities for $\bullet^6$.
4. At $\bullet^7$ accept "$x>-4$ and $x<-1$" or "$x>-4$, $x<-1$" together with the required justification.

Commonly Observed Responses:

Candidate B

$9x^2+30x+25-2<3x^2-6+5$	$\bullet^4$ ✓
$6x^2+30x+24<0$	$\bullet^5$ ✓
$6x^2+30x+24=0$	
$x=-1,\ x=-4$	$\bullet^6$ ✓
$-4<x<-1$ with sketch	$\bullet^7$ ✓

Candidate C

$9x^2+30x+25-2<3x^2-6+5$	$\bullet^4$ ✓
$6x^2+30x+24=0$	$\bullet^5$ ✗
$x=-1,\ x=-4$	$\bullet^6$ ✓
$-4<x<-1$ with sketch	$\bullet^7$ ✗

Candidate D

$9x^2+30x+25-2=3x^2-6+5$	$\bullet^4$ ✗
$6x^2+30x+24=0$	$\bullet^5$ ✗
$x=-1,\ x=-4$	$\bullet^6$ ✓
For $f(g(x))<g(f(x))$	
$-4<x<-1$ with sketch	$\bullet^7$ ✗