QUESTION NUMBER

12.

$$-2x^2 - 12x + 7$$

$$= -2\left[x^2 + 6x\right] + 7$$

$$= -2\left[(x+3)^2 - 9\right] + 7$$

$$= -2(x+3)^2 + 18 + 7$$

$$= -2(x+3)^2 + 25.$$

DO NOT WRITE IN THIS MARGIN

Question	Generic scheme	Illustrative scheme	Max mark
12.	**Method 1** •1 identify common factor •2 complete the square •3 process for c and write in required form	**Method 1** •1 $-2\left(x^2+6x\ldots\right.$ stated or implied by •2 •2 $-2(x+3)^2\ldots$ •3 $-2(x+3)^2+25$	3
	Method 2 •1 expand completed square form •2 equate coefficients •3 process for b and c and write in required form	**Method 2** •1 $ax^2+2abx+ab^2+c$ stated or implied by •2 •2 $a=-2,\ 2ab=-12,$ **and** $ab^2+c=7$ •3 $-2(x+3)^2+25$	

Notes:

1. $-2(x+3)^2+25$ with no working gains •1 and •2 only. However, see Candidate E.
2. •1 and •3 are not available in cases where $a>0$. For example, see Candidate F.

Commonly Observed Responses:

Candidate A

$-2(x^2+6)+7$

$-2\left((x+3)^2-9\right)+7$ •1 ✓ •2 ✓

$-2(x+3)^2+25$ •3 ✓

See the exception to marking principle (h)

Candidate B

$ax^2+2abx+ab^2+c$ •1 ✓

$a=-2,\ 2ab=-12,\ ab^2+c=7$ •2 ✓

$b=3,\ c=25$ •3 ^

•3 is lost as answer is not in completed square form

Candidate C

$-2\left(x^2+12x\right)+7$ •1 ✗

$-2\left((x+6)^2-36\right)+7$ •2 ✓1

$-2(x+6)^2+79$ •3 ✓1

Candidate D

$-2\left((x+6)^2-36\right)+7$ •1 ✗ •2 ✗

$-2(x+6)^2+79$ •3 ✓1

Candidate E

$-2(x+3)^2+25$ •1 ✓ •2 ✓

Check: $=-2\left(x^2+6x+9\right)+25$

$=-2x^2-12x-18+25$

$=-2x^2-12x+7$ •3 ✓

Candidate F

$-2x^2-12x+7$

$=2x^2+12x-7$ •1 ✗

$=2\left(x^2+6x\ldots\right.$

$=2(x+3)^2\ldots$ •2 ✓1

$=-2(x+3)^2\ldots$ •3 ✗