11. $2(x^2+6x)+23$

$2(x+3)^2+23-18$

$2(x+3)^2+5$

Question	Generic Scheme	Illustrative Scheme	Max Mark
11.	**Method 1** •¹ identify common factor •² complete the square •³ process for r and write in required form	**Method 1** •¹ $2\left(x^2+6x\ldots\right)$ stated or implied by •² •² $2\left(x+3\right)^2\ldots$ •³ $2\left(x+3\right)^2+5$	3
	Method 2 •¹ expand completed square form •² equate coefficients •³ process for q and r and write in required form	**Method 2** •¹ $px^2+2pqx+pq^2+r$ •² $p=2,\ 2pq=12,\ pq^2+r=23$ •³ $2\left(x+3\right)^2+5$	

Notes:

1. $2\left(x+3\right)^2+5$ with no working gains •¹ and •² only. However, see Candidate E.

Commonly Observed Responses:

Candidate A

$2\left(x^2+6\right)+23$

$2\left(\left(x+3\right)^2-9\right)+23$ •¹ ✓ •² ✓

$2\left(x+3\right)^2+5$ •³ ✓

See the exception to marking principle (h)

Candidate B

$px^2+2pqx+pq^2+r$ •¹ ✓

$p=2,\ 2pq=12,\ pq^2+r=23$ •² ✓

$q=3,\ r=5$ •³ ^

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

Candidate C

$2\left(x^2+12x\right)+23$ •¹ ✗

$2\left(\left(x+6\right)^2-36\right)+23$ •² ✓ 1

$2\left(x+6\right)^2-49$ •³ ✓ 1

Candidate D

$2\left(\left(x+6\right)^2-36\right)+23$ •¹ ✗ •² ✗

$2\left(x+6\right)^2-49$ •³ ✓ 1

Candidate E

$2\left(x+3\right)^2+5$ •¹ ✓ •² ✓

Check: $=2\left(x^2+6x+9\right)+5$

$=2x^2+12x+18+5$

$=2x^2+12x+23$ •³ ✓