3.

$$\int 7\cos\left(4x + \frac{\pi}{3}\right) dx$$

$$= \frac{7}{4}\cos\left(4x + \frac{\pi}{3}\right) + C$$

Question	Generic scheme	Illustrative scheme	Max mark
3.	$\bullet^1$ start to integrate	$\bullet^1$ $7\sin\left(4x+\frac{\pi}{3}\right)\ldots$	**2**
	$\bullet^2$ complete integration	$\bullet^2$ $\ldots\times\frac{1}{4}+c$	

Notes:

1. Award $\bullet^1$ for any appearance of $(+)7\sin\left(4x+\frac{\pi}{3}\right)$ regardless of any constant multiplier.
2. Candidates who work in degrees from the start cannot gain $\bullet^1$, however $\bullet^2$ is still available - see Candidate C.
3. Where candidates use any other invalid approach, eg $7\sin\left(4x+\frac{\pi}{3}\right)^2$,

   $\int\left(7\cos 4x+\cos\frac{\pi}{3}\right)dx$ or $7\sin 4x+\frac{\pi}{3}$ award 0/2. However, see Candidate E.
4. Do not penalise the appearance of an integral sign and/or dx throughout.

Commonly Observed Responses:

Candidate A - using addition formula

$\int\left(7\cos 4x\cos\frac{\pi}{3}-7\sin 4x\sin\frac{\pi}{3}\right)dx$

$=\frac{7}{4}\sin 4x\cos\frac{\pi}{3}+\frac{7}{4}\cos 4x\sin\frac{\pi}{3}\ldots$ $\bullet^1$ ✓

$=\frac{7}{4}\sin 4x\left(\frac{1}{2}\right)+\frac{7}{4}\cos 4x\left(\frac{\sqrt{3}}{2}\right)+c$ $\bullet^2$ ✓

Candidate B

$\frac{7}{4}\sin\left(4x+\frac{\pi}{3}\right)$ $\bullet^1$ ✓

$=\frac{7}{4}\sin\left(4x+\frac{\pi}{3}\right)+c$ $\bullet^2$ ✓

Candidate C - working in degrees

$\int 7\cos(4x+60)\,dx$

$=7\sin(4x+60)\times\frac{1}{4}+c$ $\bullet^1$ ✗ $\bullet^2$ ✓1

Candidate D - integrating over two lines

$7\sin\left(4x+\frac{\pi}{3}\right)$ $\bullet^1$ ✓

$=\frac{7}{4}\sin\left(4x+\frac{\pi}{3}\right)+c$ $\bullet^2$ ✗

Candidate E - integrating in part

$-\frac{7}{4}\sin\left(4x+\frac{\pi}{3}\right)+c$ $\bullet^1$ ✗ $\bullet^2$ ✓1

Candidate F - insufficient evidence of integration

$\frac{7}{4}\cos\left(4x+\frac{\pi}{3}\right)+c$ $\bullet^1$ ✗ $\bullet^2$ ✗