Question Number	Scheme	Marks
2 (a)	Strip width = 1.5	B1
	$\frac{3}{4}\{4.16+2.28+2\times(2.91+a+1.73+1.37+1.43)\}=19.3\Rightarrow a=...$	M1
	a = awrt 2.21	A1
		(3)
(b)	$\int_{-4}^{5}(2\,\mathrm{f}(x)-3)\,\mathrm{d}x=2\times19.3-[3x]_{-4}^{5}$	M1
	=11.6	A1
		(2)
		Total 5

(a)

B1: Correct strip width. Allow for $h=1.5$. It is implied by sight of $\frac{1.5}{2}\{.....\}$ o.e.

Note that $h=-1.5$ is B0 unless recovered later in the working.

M1: 'Correct' attempt at the trapezium rule leading to a value for *a*.

Look for $\frac{...}{2}\{4.16+2.28+2\times(2.91+a+1.73+1.37+1.43)\}=19.3$ leading to a value for a

Condone a missing trailing bracket.

Condone $...\{4.16+2.28+2\times(2.91+a+1.73+1.37+1.43)\}=19.3$ leading to a value for a if $\frac{...}{2}$ not seen.

Award for the sum of separate trapezia leading to a value for *a*

You do not need to check their calculation but it must lead to a value for *a*

A1: *a* = awrt 2.21.

It is acceptable for the candidate to be working in fractions. Score for $\frac{331}{150}$ or $2\,\frac{31}{150}$.

ISW after a correct answer.

(b) Answers resulting from attempts at the trapezium rule score M0 A0

M1: Attempts to find $\int_{-4}^{5}(2\,\mathrm{f}(x)-3)\,\mathrm{d}x$ but condone $\int_{-4}^{5}(2\,\mathrm{f}(x)\pm3)\,\mathrm{d}x$

Look for $2\times19.3\pm[3x]_{-4}^{5}$, $2\times19.3\pm3\times9$ or $2\times19.3\pm27$ o.e.

If $2\times19.3-[3x]_{-4}^{5}$ is not seen, look for 2×19.3 combined with a ±15 **and** a ±12

So each of $2\times19.3-15+12$, $2\times19.3-((15)-(12))$, $2\times19.3-(15+12)$ and $2\times19.3+15-12$ are M1

Candidates who attempt $2\times'2.21'-[3x]_{-4}^{5}$ scores M0 as it uses the value of *a*

Candidates who attempt $2\times19.3-3$ scores M0 as no integration of the 3 was attempted (unless you see sight of a ±15 **and** a ±12 before the 3 was reached)

A1: 11.6 The answer with no incorrect working can score both marks

Question Number	Scheme	Marks
3(a)	Attempts to complete the square for both variables $\left(x+4\right)^2,\left(y-7\right)^2$	M1
	Centre $\left(-4,7\right)$	A1
	Radius = 12	A1
		(3)
(b)	Attempts $"\pm\left(12"-\sqrt{"4"^2+"7"^2}\right)$	M1
	$12-\sqrt{65}$	A1 ft
		(2)
		Total 5

(a)

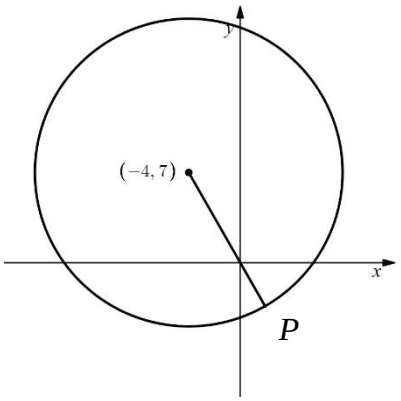
M1: Attempts to complete the square for **both** variables. Score for sight of $\left(x+4\right)^2...\left(y-7\right)^2$

Condone $\left(x\pm4\right)^2,\left(y\pm7\right)^2$ or even with a negative between. It is implied by a centre of $\left(\pm4,\pm7\right)$

A1: Centre $\left(-4,7\right)$

A1: Radius = 12. May be awarded following a centre of $\left(\pm4,\pm7\right)$

(b)



M1: Attempts $\pm\left("12"-\sqrt{"4"^2+"7"^2}\right)$ which may be in decimals. Look for $\pm\left(12-8.06\right)$ or ±3.94 following a correct (a)

Must be an attempt at subtraction of $"12"$ and $\sqrt{"4"^2+"7"^2}$ either way around and not addition

A1ft: $12-\sqrt{65}$ but ft on their $12-\sqrt{65}$ which must be exact and positive. ISW if followed by the decimal answer

……

Alt (b): You may see various attempts using the intersection of their $y=-\frac{7}{4}x$ and the equation of the circle.

The method mark is scored when the equations are solved to find coordinates for *P* followed by the calculation of distance *OP*.

M1: Equates their $y=-\frac{7}{4}x$ (must agree with their centre) with either the original equation or their adapted equation to set up a 3 term quadratic equation in either *x* or *y*. This must be solved by an appropriate method which includes use of calculator (you may need to check if just answers are given). Once a value of *x* and *y* have been found, score for the use of Pythagoras' theorem (e.g. $\sqrt{x^2+y^2}$) to find the length. It is highly unlikely that an exact answer could be found via this route.