Question Number	Scheme	Marks
7(a)	States or implies that gradient $XN = -\frac{2}{5}$	B1
	Uses $(4,-3)$ with a gradient of $\pm\frac{2}{5}$ to form equation of XN	M1
	$y+3=-\frac{2}{5}(x-4)$	
	$5y+15=-2x+8 \Rightarrow 2x+5y+7=0$ *	A1*
		(3)
(b)	(i) Solves $2x+5y+7=0$ and $y=\frac{5}{2}x-\frac{55}{2} \Rightarrow x=...,y=...$	M1
	$N=(9,-5)$	A1
	(ii) Attempts $("9"-4)^2+("-5"+3)^2$	M1
	Correct form of equation E.g. $(x-4)^2+(y+3)^2=("9"-4)^2+("-5"+3)^2$	M1
	$(x-4)^2+(y+3)^2=29$	A1
		(5)
		(8 marks)

(a) **This is a given answer so be careful of students who work backwards.**

B1: States or implies that gradient $XN = -\frac{2}{5}$ o.e such as -0.4

This cannot be scored from candidates who show you they are just working back from the given answer.

M1: Uses $(4,-3)$ with a gradient of $\pm\frac{2}{5}$ o.e. to form equation of XN

E.g $\pm\frac{2}{5}=\frac{y-(-3)}{x-4}$. If the form $y=mx+c$ is used look for $-3=\left(\pm\frac{2}{5}\right)\times 4+c$ leading to c = ...

A1*: Shows sufficient working and proceeds to $2x+5y+7=0$. There should be one correct line showing working between $y+3=-\frac{2}{5}(x-4)$ and $2x+5y+7=0$, for example $5y+15=-2x+8$

If $y=mx+c$ is used expect to see $c=-\frac{7}{5}$ and $y=-\frac{2}{5}x-\frac{7}{5}$ before $2x+5y+7=0$.

Note that this is a given answer so there cannot be incorrect work used leading to this answer.

(b)(i)

M1: Attempts to solve $2x+5y+7=0$ and $y=\frac{5}{2}x-\frac{55}{2}$ leading to $x=...,y=...$

Allow the values to be just written down, for example via use of a calculator

A1: $N=(9,-5)$ which may be written $x=9, y=-5$

(b)(ii)

M1: Attempts radius or radius ^{2}. Condone slips on lhs, for example $r \text{ or } d = (\text{"9"} - 4)^2 + (\text{"}-5\text{"} + 3)^2$

You must see an attempt to take the difference for both components before each are squared.

M1: Correct form of equation E.g. $(x-4)^2 + (y+3)^2 = \text{"}r\text{"}^2$

Look for $(x-4)^2 + (y+3)^2 = (\text{"9"} - 4)^2 + (\text{"}-5\text{"} + 3)^2$

Condone for this mark a slip on one of the components when finding their r^2

A1: $(x-4)^2 + (y+3)^2 = 29$ or exact equivalent. The constant terms must be collected and not $25+4$

ISW after a correct answer.

Alt (b)(ii)

Note that an alternative version is $x^2 + y^2 - 8x + 6y - 4 = 0$. It is possible to proceed using this alternative version of the formula for a circle

M1: States equation of circle is $x^2 + y^2 - 8x + 6y + c = 0$

M1: Substitutes their $N = (9, -5)$ into $x^2 + y^2 - 8x + 6y + c = 0$ o.e. and finds "c"

A1: $x^2 + y^2 - 8x + 6y - 4 = 0$ o.e.

Question Number	Scheme	Marks
8. (a)	Uses $S_{10}=360\Rightarrow\frac{10}{2}\{2\times a+9\times 4\}=360$	M1
	$\Rightarrow 2a+36=72\Rightarrow a=18$	A1
		(2)
(b)	Uses $S_n=2146\Rightarrow\frac{n}{2}\{2\times"18"+(n-1)\times 4\}=2146$	M1
	$\Rightarrow n\{16+2n\}=2146$	
	$\Rightarrow n^2+8n-1073=0$ *	A1*
		(2)
(c)	(i) States 29	B1
	(ii) Attempts $"18"+("29"-1)\times 4=130$	M1, A1
		(3)
		(7 marks)

(a)

M1: Uses $S_{10}=360$ with a correct formula to set up a linear equation in "a". E.g. $\frac{10}{2}\{2\times a+9\times 4\}=360$

Alternatively uses the sum of all 10 terms

$a+(a+4)+(a+8)+(a+12)+(a+16)+(a+20)+(a+24)+(a+28)+(a+32)+(a+36)=360$

A1: $a=18$ following a correct equation

(b)

M1: Attempts to use $S_n=2146\Rightarrow\frac{n}{2}\{2\times"18"+(n-1)\times 4\}=2146$ following through on their value of "a"

A1*: Proceeds to $n^2+8n-1073=0$ showing sufficient working, which in most circumstances should be regarded as one correct simplified intermediate line. (See main scheme)

(c)(i)

B1: States 29.

The -37 if written down must be deleted/crossed out, or the 29 chosen by being "ringed" or underlined

(c)(ii)

M1: Attempts $a+(n-1)\times 4$ with their values of a and n. E.g. $"18"+("29"-1)\times 4$

Alternatively uses $2146\Rightarrow\frac{29}{2}\{"18"+l\}\Rightarrow l=...$

A1: Maximum number of seats $=130$ which may be labelled $l=130$

This alone scores both marks (but only if they had a = 18 and n =29 earlier)