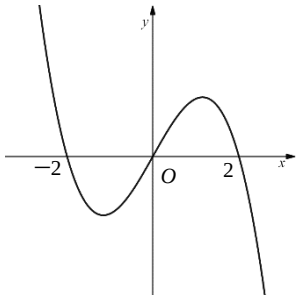
Question	Scheme	Marks
8(a)		B1B1B1
		(3)
(b)	$x\left(4-x^2\right)=\dfrac{A}{x}\Rightarrow 4x^2-x^4=A$ $\Rightarrow x^4-4x^2+A=0*$	B1*
		(1)
(c)	$A>0$	B1
	$b^2=4ac\Rightarrow 16=4A\Rightarrow A=...$	M1
	$0<A<4$	A1
		(3)
		Total 7

Notes:

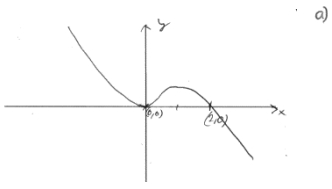
(a)

B1: Negative cubic curve in any position. Must have one maximum and one minimum.

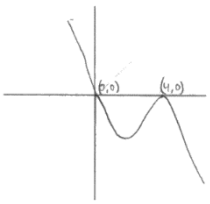
B1: Positive or negative cubic curve **passing through** (not touching) the origin.
The origin does not have to be labelled.

B1: Cuts the x-axis at $x = 2$ and $x = -2$. May be as shown or as (2, 0) and (−2, 0).
Must cut so extends beyond the x-axis from above or below but **not** a turning point.
Condone (0, 2) and (0, −2) as long as they are in the correct positions.
Allow away from the sketch but must be (2, 0) and (−2, 0).
If there is any ambiguity, the sketch takes precedence.

Examples:



100



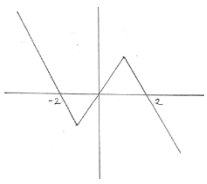
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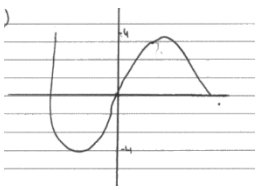
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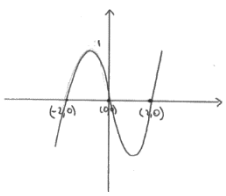
010



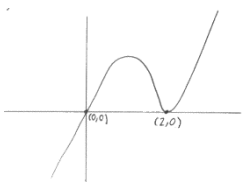
001



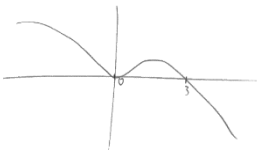
110



011



010



000

(b)

B1*: Equates the curves and shows sufficient working to obtain the printed answer with no errors.

Note that $x\left(4-x^2\right)$ may be expanded first before equating which is fine.

There must be at least one intermediate step between $x\left(4-x^2\right)=\frac{A}{x}$ and the printed answer.

As a minimum accept $x\left(4-x^2\right)=\frac{A}{x} \Rightarrow 4x-x^3=\frac{A}{x} \Rightarrow x^4-4x^2+A=0$

(c)

B1: For $A > 0$ as one boundary. May be seen embedded in their final answer. $x > 0$ is B0.

M1: Attempts $b^2=4ac$ or equivalent e.g. $b^2-4ac=0$ with $a = 1$, $b = -4$ and $c = A$ to obtain a value for A.

Condone use of an inequality rather than "=" to obtain a value or inequality for A e.g. $b^2-4ac>0$ or $b^2-4ac<0$ leading to $A > \ldots$ or $A < \ldots$

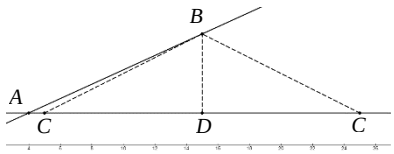
May be implied by e.g. $A = 4$, $A < 4$, $A > 4$ etc.

A1: Correct range for A. Allow equivalents e.g. "$A > 0$ **and** $A < 4$", "$(0, 4)$"

but not "$A > 0$ **or** $A < 4$", "$A > 0$, $A < 4$"

Correct answer with no working scores 3/3

Partially correct answer with no working e.g. $0 < A \leqslant 4$ **can score B1 M1 (implied) A0**

Question	Scheme	Marks
9(a)	$m = \frac{7-2}{15-4}\left(=\frac{5}{11}\right)$	M1
	$y-2=\frac{5}{11}(x-4)$ or $y-7=\frac{5}{11}(x-15)$ or $y=\frac{5}{11}x+c \Rightarrow 2=\frac{5}{11}\times 4+c \Rightarrow c=...\left(\frac{2}{11}\right)$	M1
	$5x-11y+2=0$	A1
		(3)
(a) ALT	$y=mx+c \Rightarrow \begin{matrix}2=4m+c\\7=15m+c\end{matrix}$	M1
	$\begin{matrix}2=4m+c\\7=15m+c\end{matrix} \Rightarrow m=...\left(\frac{5}{11}\right),\quad c=...\left(\frac{2}{11}\right)$	M1
	$5x-11y+2=0$	A1
(b)	$(15-x)^2+(7-2)^2=\left(5\sqrt{5}\right)^2$ or e.g. $\sqrt{(15-x)^2+(7-2)^2}=5\sqrt{5}$ or e.g. $\left(5\sqrt{5}\right)^2=5^2+CD^2$ oe 	M1
	Way 1: $(15-x)^2+25=125 \Rightarrow (15-x)^2=100 \Rightarrow x=...$ or e.g. Way 2: $125=25+CD^2 \Rightarrow CD^2=100 \Rightarrow CD=10 \Rightarrow x=...$	M1
	$(5,\ 2)$ **or** $(25,\ 2)$	A1
	$(5,\ 2)$ **and** $(25,\ 2)$	A1
		(4)
(c)	Area $=\frac{1}{2}("5"-4)\times 5$	M1
	$=\frac{5}{2}$	A1
		(2)
		Total 9

Notes:

(a)

M1: Correct method for the gradient

M1: For a correct straight line method using their gradient and point *A* or point *B* with *x* and *y* correctly placed. Alternatively uses $y = mx + c$ and reaches $c = \ldots$

Note that $\frac{y-2}{7-2}=\frac{x-4}{15-4}$ scores both M marks.

A1: Correct equation in the required form including the "= 0". Allow any integer multiple of this equation.

ALT

M1: Substitutes $x = 4$, $y = 2$ and $x = 15$, $y = 7$ into the general equation $y = mx + c$ to obtain 2 equations in *m* and *c*.

M1: Solves 2 equations of the form $\alpha = m\beta + c$ to find values for *m* and *c*.

A1: Correct equation in the required form including the "= 0". Allow any integer multiple of this equation.