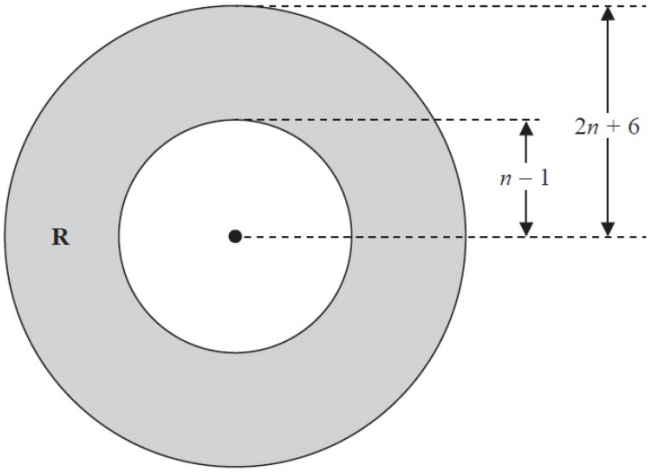
A31...Expanding Double Brackets- Area Problems

OCR

Edexcel

12 The region **R**, shown shaded in the diagram, is the region between two circles with the same centre.



The outer circle has radius $(2n + 6)$
The inner circle has radius $(n - 1)$
All measurements are in centimetres.

The area of **R** is greater than the area of a circle of radius $(n + 13)$ cm.

n is an integer.

Find the least possible value of n.
You must show all of your working.

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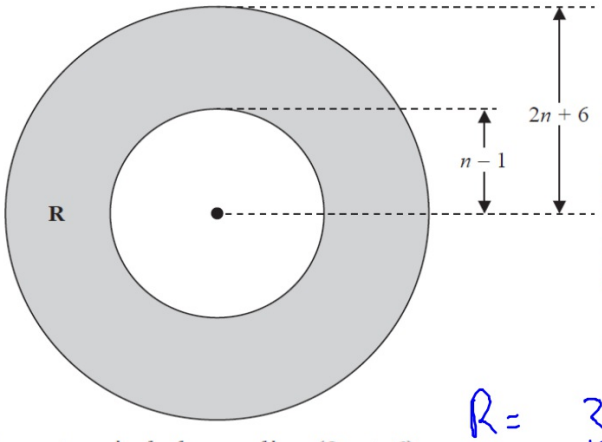
(Total for Question 12 is 5 marks)

Created by W Neill

12 The region **R**, shown shaded in the diagram, is the region between two circles with the same centre.



full circle

$(2n+6)^2 \times \pi$

$(2n+6)(2n+6)$

$4n^2+12n+12n+36$

$4n^2+24n+36$

Inner Circle

$(n-1)^2 \times \pi$

$(n-1)(n-1)$

n^2-2n+1

$4n^2+24n+36-(n^2-2n+1)$

$R = 3n^2+26n+35$

The outer circle has radius $(2n + 6)$
The inner circle has radius $(n - 1)$
All measurements are in centimetres.

The area of **R** is greater than the area of a circle of radius $(n + 13)$ cm.

Other circle

$(n+13)^2 \times \pi$

$n^2+26n+169$

n is an integer.

Find the least possible value of n.
You must show all of your working.

$3n^2+26n+35 > n^2+26n+169$

$3n^2-n^2 > 169-35$

$2n^2 > 134$

$n^2 > 67$

$8^2 = 64$

$9^2 = 81$

9

(Total for Question 12 is 5 marks)

AQA