



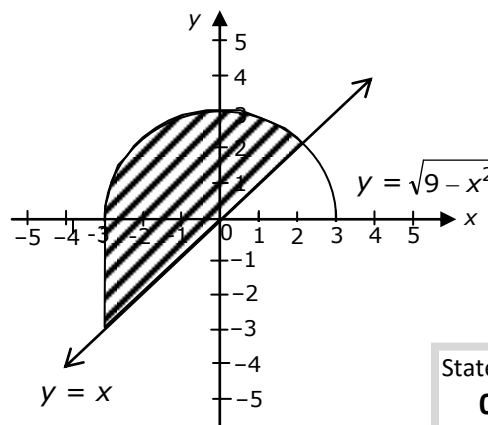
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- 2015 13** (i) Find the domain and range for the function $f(x) = \sqrt{9 - x^2}$. **2**
b (ii) On a number plane, shade the region where the points (x, y) satisfy both of **2**
the inequalities $y \leq \sqrt{9 - x^2}$ and $y \geq x$.

- (i) Domain: $-3 \leq x \leq 3$
Range: $0 \leq f(x) \leq 3$

State Mean:
1.11

(ii)



State Mean:
0.68

* These solutions have been provided by [projectmaths](#) and are not supplied or endorsed by BOSTES.

Board of Studies: Notes from the Marking Centre

(b)(i) This part was challenging. Candidates who sketched $y = \sqrt{9 - x^2}$ were generally more successful in finding the correct domain and range.

Common problems were:

- incorrectly stating their solution as $x \geq -3, x \leq 3$ instead of $-3 \leq x \leq 3$
- not recognising the function as a semicircle and using the same values for the domain and range
- having the inequality signs reversed or using $<$ instead of \leq
- only stating the domain
- giving the range as $y \geq 0$ since a square root is always positive.

(b)(ii) This part was challenging. Many candidates correctly graphed the semicircle but were less successful adding the graph of $y = x$ and correctly shading the required region. Candidates are reminded to draw neat, clear diagrams, use a ruler to draw lines and show a scale on each axis. The size of each diagram should be at least one-third of a page.

Common problems were:

- not drawing the vertical boundaries of $|x| = 3$ for the semicircular region
- not shading any region at all or not continuing the region below the x-axis between the lines $x = -3$ and $y = x$
- sketching the semicircle only and not the line $y = x$
- drawing an incorrect semicircle, for example $y = -\sqrt{9 - x^2}$
- graphing the solution as an inequality on a number line.