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2014 11e Solve $\dfrac{x^2+5}{x} > 6$. **3**

$$\frac{x^2+5}{x} > 6$$

Boundary or critical points occur at discontinuities or at inequalities.

There is a discontinuity (not included) at

$$x = 0$$

There is an equality (not included) at

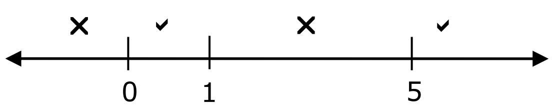
$$\frac{x^2+5}{x} = 6$$

$$x^2 + 5 = 6x$$

$$x^2 - 6x + 5 = 0$$

$$(x - 5)(x - 1) = 0$$

$$x = 5, 1$$



$y(-1) < 0$, $y(0.5) > 0$, $y(3) < 0$, $y(6) > 0$,

$\therefore 0 < x < 1$ or $x > 5$

Or: $\dfrac{x^2+5}{x} > 6$

Multiply both sides by x^2:

$$x^2 \times \frac{x^2+5}{x} > x^2 \times 6$$

$$x(x^2 + 5) > 6x^2$$

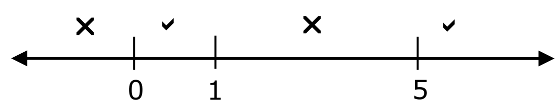
$$x^3 + 5x > 6x^2$$

$$x^3 - 6x^2 + 5x > 0$$

$$x(x^2 - 6x + 5) > 0$$

$$x(x - 5)(x - 1) > 0$$

Consider $x = 0, 1, 5$



$y(-1) < 0$, $y(0.5) > 0$, $y(3) < 0$, $y(6) > 0$,

$\therefore 0 < x < 1$ or $x > 5$

State Mean: **2.36**

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by BOSTES.

Board of Studies: Notes from the Marking Centre

This question was answered quite well by most candidates. The most common method used to establish the critical points was to multiply LHS and RHS by the square of the denominator, in this case x^2. Candidates performed some basic algebraic processes to arrive at critical values of 0, 1 and 5. Successful responses of '$0 < x < 1$ or $x > 5$' occurred where the values were tested, by trial and error, or where diagrams were drawn on a number line (or number plane) to verify the solution set

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/2014/pdf_doc/2014-maths-ext-1.pdf

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