

STEP III, 2001 Q3

3 Consider the equation

$$x^2 - bx + c = 0,$$

where b and c are real numbers.

- (i) Show that the roots of the equation are real and positive if and only if $b > 0$ and $b^2 \geq 4c > 0$, and sketch the region of the b - c plane in which these conditions hold.
- (ii) Sketch the region of the b - c plane in which the roots of the equation are real and less than 1 in magnitude.



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