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## Modulus Inequalities | Past Paper Question | C3 OCR January 2013 Q3(b)

Solve the inequality  $|x - \sqrt{2}| > |x + 3\sqrt{2}|$ .

For A:

$$-x + \sqrt{2} = x + 3\sqrt{2}$$
$$\therefore -2x = 2\sqrt{2}$$
$$\therefore x = -\sqrt{2}$$
$$\therefore \text{if } |x - \sqrt{2}| > |x + 3\sqrt{2}| \Rightarrow x < -\sqrt{2}$$

or

$$(x - \sqrt{2})^2 > (x + 3\sqrt{2})^2$$
$$\therefore x^2 - 2\sqrt{2}x + 2 > x^2 + 6\sqrt{2}x + 18$$
$$\therefore -8\sqrt{2}x > 16$$
$$\therefore x < \frac{16}{-8\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$
$$\therefore x < \frac{2\sqrt{2}}{-2}$$
$$\therefore x < -\sqrt{2}$$

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