

Adrian Chan
229 Old Yonge Street
Toronto, Ontario, Canada
M2P 1R5

Mitko Kounchev
Mathematic School BABA TONKA
7000 Ruse, 18 Ivan Vasov Street
Bulgaria
direktor@mg-babatonka.bg

H253. Find all the solutions to the equation:

$$\sqrt{3x^2 - 12x + 52} + \sqrt{2x^2 - 12x + 162} = \sqrt{-x^2 + 6x + 280}.$$

Solution:

$$\begin{aligned} \sqrt{3x^2 - 12x + 52} + \sqrt{2x^2 - 12x + 162} &= \sqrt{3(x-2)^2 + 40} + \sqrt{2(x-3)^2 + 144} \geq \\ &\geq \sqrt{40} + \sqrt{144} > 17 = \sqrt{289} \geq \sqrt{289 - (x-3)^2} = \sqrt{-x^2 + 6x + 280}. \end{aligned}$$

The given equation hasn't any real solutions.