

13. Rješenja zadane jednadžbe pokazat će ti na kojoj geografskoj širini i dužini se smjestio grad Krapina.

$$75 \sin^2 x + 4.6 \cos^2 x = 66.2 \sin 2x - 25$$

(Napomena: dobiveni rezultat zaokruži na 1 decimalu)

(3.R)

(autor zadatka: Ana Tušek, 3.a razred)

Rješenje:

$$75 \sin^2 x + 4.6 \cos^2 x = 66.2 \sin 2x - 25$$

$$75 \sin^2 x - 66.2 \cdot 2 \cdot \sin x \cos x + 4.6 \cos^2 x = -25$$

$$75 \sin^2 x - 132.4 \sin x \cos x + 4.6 \cos^2 x = -25$$

$$75 \sin^2 x - 132.4 \sin x \cos x + 4.6 \cos^2 x = -25 \cdot (\sin^2 x + \cos^2 x)$$

$$100 \sin^2 x - 132.4 \sin x \cos x + 29.6 \cos^2 x = 0 \quad /: \cos^2 x$$

$$100 \operatorname{tg}^2 x - 132.4 \operatorname{tg} x + 29.6 = 0$$

$$\operatorname{tg} x_1 = \frac{132.4+75.43}{200} = 1.039 \quad \operatorname{tg} x_2 = \frac{132.4-75.43}{200} = 0.285$$

$$\operatorname{arctg}_1(1.039) = 46.1^\circ$$

$$\operatorname{arctg}_2(0.285) = 15.9^\circ$$

Krapina je smještena na 46.1° sjeverne geografske širine i 15.9° istočne geografske dužine .

The solution of the following equation

$$75 \sin^2 x + 4.6 \cos^2 x = 66.2 \sin 2x - 25$$

will lead you to the geographical latitude and longitude of Krapina.

Note: Round the solution to one decimal.

(3G)

(author: Ana Tušek, 3a grade)

Solution:

$$75 \sin^2 x + 4.6 \cos^2 x = 66.2 \sin 2x - 25$$

$$75 \sin^2 x - 66.2 \cdot 2 \cdot \sin x \cos x + 4.6 \cos^2 x = -25$$

$$75 \sin^2 x - 132.4 \sin x \cos x + 4.6 \cos^2 x = -25$$

$$75 \sin^2 x - 132.4 \sin x \cos x + 4.6 \cos^2 x = -25 \cdot (\sin^2 x + \cos^2 x)$$

$$100 \sin^2 x - 132.4 \sin x \cos x + 29.6 \cos^2 x = 0 \quad /: \cos^2 x$$

$$100 \operatorname{tg}^2 x - 132.4 \operatorname{tg} x + 29.6 = 0$$

$$\operatorname{tg} x_{1,2} = \frac{132.4 \pm \sqrt{(-132.4)^2 - 4 \cdot 100 \cdot 29.6}}{2 \cdot 100}$$

$$\operatorname{tg} x_1 = \frac{132.4 + 75.43}{200} = 1.039 \quad \operatorname{tg} x_2 = \frac{132.4 - 75.43}{200} = 0.285$$

$$\operatorname{arctg}_1(1.039) = 46.1^\circ$$

$$\operatorname{arctg}_2(0.285) = 15.9^\circ$$

Krapina is situated 46.1° north (latitude) and 15.9° east (longitude).

Die Lösung der Gleichung:

$$75 \sin^2 x + 4.6 \cos^2 x = 66.2 \sin 2x - 25$$

Zeigt dir die geographischen Koordinaten von Krapina.

(Anmerkung: die Lösung auf eine Dezimale abrunden.)

(3. Kl.)

(Autorin: Ana Tušek, Klasse 3A)

Lösung:

$$75 \sin^2 x + 4.6 \cos^2 x = 66.2 \sin 2x - 25$$

$$75 \sin^2 x - 66.2 \cdot 2 \cdot \sin x \cos x + 4.6 \cos^2 x = -25$$

$$75 \sin^2 x - 132.4 \sin x \cos x + 4.6 \cos^2 x = -25$$

$$75 \sin^2 x - 132.4 \sin x \cos x + 4.6 \cos^2 x = -25 \cdot (\sin^2 x + \cos^2 x)$$

$$100 \sin^2 x - 132.4 \sin x \cos x + 29.6 \cos^2 x = 0 \quad /: \cos^2 x$$

$$100 \operatorname{tg}^2 x - 132.4 \operatorname{tg} x + 29.6 = 0$$

$$\operatorname{tg} x_{1,2} = \frac{132.4 \pm \sqrt{(-132.4)^2 - 4 \cdot 100 \cdot 29.6}}{2 \cdot 100}$$

$$\operatorname{tg} x_1 = \frac{132.4 + 75.43}{200} = 1.039 \quad \operatorname{tg} x_2 = \frac{132.4 - 75.43}{200} = 0.285$$

$$\operatorname{arctg}_1(1.039) = 46.1^\circ$$

$$\operatorname{arctg}_2(0.285) = 15.9^\circ$$

Krapina liegt auf 46.1° nördlicher geogr. Breite und 15.9° östlicher geogr. Länge.