

**SVODJENJE NA KANONSKI OBLIK  
(KRIVE DRUGOG REDA)**

**ZADACI**

**1. Sledeću jednačinu svesti na kanonski oblik i odrediti koja kriva je njome određena:**

$$2x^2 + 5xy + 2y^2 - 2 = 0$$

**Rešenje:**

Datu jednačinu upoređujemo sa  $Ax^2 + 2Bxy + Cy^2 + 2Dx + 2Ey + F = 0$ , pa je :

$$\left. \begin{array}{l} A = 2 \\ 2B = 5 \\ C = 2 \\ 2D = 0 \\ 2E = 0 \\ F = -2 \end{array} \right\} \text{ Odavde je dakle : } A = 2 ; B = \frac{5}{2} ; C = 2 ; D = 0 ; E = 0 ; F = -2$$

Pošto je  $D = E = 0$ , zaključujemo da kriva ima centar u (0,0). **[pogledaj fajl sa postupkom]**

Dakle, odmah **vršimo rotaciju!**

$$\operatorname{ctg} 2\alpha = \frac{A-C}{2B} \text{ pa je } \operatorname{ctg} 2\alpha = \frac{2-2}{2 \cdot \frac{5}{2}}, \text{ pa je } \operatorname{ctg} 2\alpha = 0, \text{ odnosno } 2\alpha = \frac{\pi}{2}, \text{ odakle je } \alpha = \frac{\pi}{4}$$

Kad je  $A=C$ , u sledećim primerima, odmah možemo zaključiti da je  $\alpha = \frac{\pi}{4}$ ; **zapamti!**

**Upotrebljavamo formule rotacije:**

$$\left. \begin{array}{l} x = x' \cos \alpha - y' \sin \alpha \\ y = x' \sin \alpha + y' \cos \alpha \end{array} \right\} \quad \left. \begin{array}{l} x = x' \cos \frac{\pi}{4} - y' \sin \frac{\pi}{4} \\ y = x' \sin \frac{\pi}{4} + y' \cos \frac{\pi}{4} \end{array} \right\} \quad \begin{array}{l} x = x' \cdot \frac{\sqrt{2}}{2} - y' \cdot \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} (x' - y') \\ y = x' \cdot \frac{\sqrt{2}}{2} + y' \cdot \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} (x' + y') \end{array}$$

Vraćamo se u zadatak i menjamo  $x$  i  $y$  :

$$2x^2 + 5xy + 2y^2 - 2 = 0$$

$$2\left[\frac{\sqrt{2}}{2}(x' - y')\right]^2 + 5\frac{\sqrt{2}}{2}(x' - y')\frac{\sqrt{2}}{2}(x' + y') + 2\left[\frac{\sqrt{2}}{2}(x' + y')\right]^2 - 2 = 0 \quad \text{sredjujemo...}$$

$$2\left[\frac{2}{4}(x'^2 - 2x'y' + y'^2)\right] + 5\frac{2}{4}(x'^2 - y'^2) + 2\left[\frac{2}{4}(x'^2 + 2x'y' + y'^2)\right] - 2 = 0$$

$$x'^2 - 2x'y' + y'^2 + \frac{5}{2}x'^2 - \frac{5}{2}y'^2 + x'^2 + 2x'y' + y'^2 - 2 = 0$$

$$\frac{9}{2}x'^2 - \frac{1}{2}y'^2 = 2 \quad \text{podelimo sa 2}$$

$$\frac{9}{4}x'^2 - \frac{1}{4}y'^2 = 1 \quad \text{kao trikće spustimo 9 ispod 4}$$

$$\frac{x'^2}{\frac{4}{9}} - \frac{y'^2}{4} = 1 \quad \text{ovo je jednačina hiperbole! } a^2 = \frac{4}{9} \text{ i } b^2 = 4$$

Ne moramo vršiti translaciju, jer smo već došli do rešenja! [ pogledaj fajl postupak]

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2. Jednačinu svesti na kanonski oblik i odrediti koja kriva je njome određena:

$$7x^2 + 6xy - y^2 + 28x + 12y + 28 = 0$$

Rešenje:

Upoređujemo  $7x^2 + 6xy - y^2 + 28x + 12y + 28 = 0$  sa  $Ax^2 + 2Bxy + Cy^2 + 2Dx + 2Ey + F = 0$  pa je

$$\left. \begin{array}{l} A = 7 \\ 2B = 6 \\ C = -1 \\ 2D = 28 \\ 2E = 12 \\ F = 28 \end{array} \right\} \quad \text{odavde je } A=7; B=3; C=-1; D=14; E=6, F=28$$

**Proverimo da li kriva ima centar?**

$$\left. \begin{array}{l} Aa + Bb + D = 0 \\ Ba + Cb + E = 0 \end{array} \right\} \left. \begin{array}{l} 7a + 3b + 14 = 0 \\ 3a - b + 6 = 0 \end{array} \right\} \text{ Rešenje ovog sistema je } \mathbf{a = -2 \text{ i } b = 0}$$

**Dakle, kriva ima centar O(-2,0) pa prvo radimo translaciju:**

$$\left. \begin{array}{l} x = x' + a \\ y = y' + b \end{array} \right\} \left. \begin{array}{l} x = x' - 2 \\ y = y' \end{array} \right\} \text{ ovo zamenimo u datu jednačinu } 7x^2 + 6xy - y^2 + 28x + 12y + 28 = 0$$

$$7x'^2 + 6x'y' - y'^2 + 28x' + 12y' + 28 = 0$$

$$7(x' - 2)^2 + 6(x' - 2)y' - y'^2 + 28(x' - 2) + 12y' + 28 = 0 \quad \text{sredimo...}$$

$$7(x'^2 - 4x' + 4) + 6x'y' - 12y' - y'^2 + 28x' - 56 + 12y' + 28 = 0$$

$$7x'^2 + 6x'y' - y'^2 = 0 \quad \text{“otarasili” smo se onih sa } x \text{ i } y \text{ što je i cilj translacije!}$$

**Dalje nastavljamo sa rotacijom!**

$$\operatorname{ctg} 2\alpha = \frac{A-C}{2B} \text{ pa je } \operatorname{ctg} 2\alpha = \frac{7+1}{6} \quad \text{to jest} \quad \operatorname{ctg} 2\alpha = \frac{4}{3}$$

Evo one situacije kada ne možemo odmah odrediti ugao....idemo preko trigonometrijskih formula:

$$\operatorname{ctg} 2\alpha = \frac{\operatorname{ctg}^2 \alpha - 1}{2\operatorname{ctg} \alpha} \quad \text{to jest} \quad \frac{\operatorname{ctg}^2 \alpha - 1}{2\operatorname{ctg} \alpha} = \frac{4}{3} \quad \text{pa je odavde } 3\operatorname{ctg}^2 \alpha - 8\operatorname{ctg} \alpha - 3 = 0$$

$$3\operatorname{ctg}^2 \alpha - 8\operatorname{ctg} \alpha - 3 = 0 \quad \text{uzimamo smenu } \operatorname{ctg} \alpha = t$$

$$3t^2 - 8t - 3 = 0 \quad \text{Rešenja ove kvadratne jednačine su : } t_1 = 3 \text{ i } t_2 = -\frac{1}{3}$$

$$\text{Vratimo se u smenu: } \operatorname{ctg} \alpha = 3 \text{ ili } \operatorname{ctg} \alpha = -\frac{1}{3}$$

**Ako je  $\operatorname{ctg} \alpha = 3$**

$$\text{Iskoristićemo formulice} \quad \operatorname{ctg} \alpha = \frac{\cos \alpha}{\sin \alpha} \quad \text{i} \quad \sin^2 \alpha + \cos^2 \alpha = 1$$

$$\frac{\cos \alpha}{\sin \alpha} = 3 \text{ pa je } \cos \alpha = 3 \sin \alpha \quad \text{i} \quad \text{to zamenimo u } \sin^2 \alpha + \cos^2 \alpha = 1$$

$$\sin^2 \alpha + (3 \sin \alpha)^2 = 1$$

$$10 \sin^2 \alpha = 1$$

$$\sin \alpha = \pm \frac{1}{\sqrt{10}} \quad \text{vratimo se u} \quad \cos \alpha = 3 \sin \alpha \quad \text{pa je} \quad \cos \alpha = \pm \frac{3}{\sqrt{10}}$$

$$\text{Dakle odavde su rešenja : } (\sin \alpha, \cos \alpha) = \left( +\frac{1}{\sqrt{10}}, +\frac{3}{\sqrt{10}} \right) \text{ i } (\sin \alpha, \cos \alpha) = \left( -\frac{1}{\sqrt{10}}, -\frac{3}{\sqrt{10}} \right)$$

$$\underline{\text{Ako je } \operatorname{ctg} \alpha = -\frac{1}{3}}$$

$$\frac{\cos \alpha}{\sin \alpha} = -\frac{1}{3} \quad \text{pa je} \quad \sin \alpha = -3 \cos \alpha$$

$$(-3 \cos \alpha)^2 + \cos^2 \alpha = 1$$

$$10 \cos^2 \alpha = 1 \text{ to jest } \cos \alpha = \pm \frac{1}{\sqrt{10}} \quad \text{pa to zamenimo u} \quad \sin \alpha = -3 \cos \alpha \quad \text{i dobijamo } \sin \alpha = \mu \frac{3}{\sqrt{10}}$$

$$\text{Odavde su rešenja: } (\sin \alpha, \cos \alpha) = \left( -\frac{3}{\sqrt{10}}, +\frac{1}{\sqrt{10}} \right) \text{ i } (\sin \alpha, \cos \alpha) = \left( \frac{3}{\sqrt{10}}, -\frac{1}{\sqrt{10}} \right)$$

$$\text{Sve mogućnosti su } \left( +\frac{1}{\sqrt{10}}, +\frac{3}{\sqrt{10}} \right), \left( -\frac{1}{\sqrt{10}}, -\frac{3}{\sqrt{10}} \right), \left( -\frac{3}{\sqrt{10}}, +\frac{1}{\sqrt{10}} \right) \text{ i } \left( \frac{3}{\sqrt{10}}, -\frac{1}{\sqrt{10}} \right)$$

**Od ove četiri mogućnosti, prva nama odgovara! Zašto?**

Podsetite se trigonometrijskog kruga i imajte na umu činjenicu da ugao  $\alpha \in (0, \pi)$ ! (fajl iz druge godine, ovde na sajtu, naravno)

$$\text{Dakle : } \sin \alpha = \frac{1}{\sqrt{10}} \quad \text{i} \quad \cos \alpha = \frac{3}{\sqrt{10}}$$

**Dalje koristimo formule rotacije:**

$$\left. \begin{aligned} x' &= x'' \cos \alpha - y'' \sin \alpha \\ y' &= x'' \sin \alpha + y'' \cos \alpha \end{aligned} \right\} \quad \left. \begin{aligned} x' &= \frac{3}{\sqrt{10}} x'' - \frac{1}{\sqrt{10}} y'' \\ y' &= \frac{1}{\sqrt{10}} x'' + \frac{3}{\sqrt{10}} y'' \end{aligned} \right\} \quad \text{ovo menjamo u} \quad 7x'^2 + 6x'y' - y'^2 = 0$$

$$7x'^2 + 6x'y' - y'^2 = 0$$

$$7\left(\frac{3}{\sqrt{10}}x'' - \frac{1}{\sqrt{10}}y''\right)^2 + 6\left(\frac{3}{\sqrt{10}}x'' - \frac{1}{\sqrt{10}}y''\right)\left(\frac{1}{\sqrt{10}}x'' + \frac{3}{\sqrt{10}}y''\right) - \left(\frac{1}{\sqrt{10}}x'' + \frac{3}{\sqrt{10}}y''\right)^2 = 0$$

Ovaj izraz ,naravno, sredimo...

$$7x''^2 - 2y''^2 = 0 \quad \text{je konačno rešenje!}$$

Ono predstavlja dve prave koje se seku!

3. Sledeću jednačinu svesti na kanonski oblik i odrediti koja kriva je njome određena:

$$x^2 - 2xy + y^2 - 12x + 12y - 13 = 0$$

Rešenje:

$$\left. \begin{array}{l} A = 1 \\ 2B = -2 \\ C = 1 \\ 2D = -12 \\ 2E = 12 \\ F = -13 \end{array} \right\} \text{ odavde je } \left. \begin{array}{l} A = 1 \\ B = -1 \\ C = 1 \\ D = -6 \\ E = 6 \\ F = -13 \end{array} \right\}$$

Tražimo centar:

$$\left. \begin{array}{l} Aa + Bb + D = 0 \\ Ba + Cb + E = 0 \end{array} \right\} \left. \begin{array}{l} a - b - 6 = 0 \\ -a + b + 6 = 0 \end{array} \right\} \text{ Ovaj sistem ima beskonačno mnogo rešenja( iste jednačine) } \\ \text{to jest } AC - B^2 = 0$$

Dakle idemo u rotaciju...

$$\operatorname{ctg} 2\alpha = \frac{A-C}{2B} \quad \text{Kako su } A \text{ i } C \text{ jednaki ,to je } \alpha = \frac{\pi}{4}$$

$$\left. \begin{aligned} x &= x' \cos \alpha - y' \sin \alpha \\ y &= x' \sin \alpha + y' \cos \alpha \end{aligned} \right\} \quad \left. \begin{aligned} x &= x' \cos \frac{\pi}{4} - y' \sin \frac{\pi}{4} \\ y &= x' \sin \frac{\pi}{4} + y' \cos \frac{\pi}{4} \end{aligned} \right\} \quad \begin{aligned} x &= x' \frac{\sqrt{2}}{2} - y' \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} (x' - y') \\ y &= x' \frac{\sqrt{2}}{2} + y' \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} (x' + y') \end{aligned}$$

$$x^2 - 2xy + y^2 - 12x + 12y - 13 = 0$$

$$\left[ \frac{\sqrt{2}}{2} (x' - y') \right]^2 - 2 \frac{\sqrt{2}}{2} (x' - y') \frac{\sqrt{2}}{2} (x' + y') + \left[ \frac{\sqrt{2}}{2} (x' + y') \right]^2 - 12 \frac{\sqrt{2}}{2} (x' - y') + 12 \frac{\sqrt{2}}{2} (x' + y') - 13 = 0$$

$$\frac{2}{4} (x'^2 - 2x'y' + y'^2) - 2 \frac{2}{4} (x'^2 - y'^2) + \frac{2}{4} (x'^2 + 2x'y' + y'^2) - 6\sqrt{2} (x' - y') + 6\sqrt{2} (x' + y') - 13 = 0$$

$$\cancel{\frac{1}{2}x'^2} - \cancel{x'y'} + \cancel{\frac{1}{2}y'^2} - \cancel{x'^2} + y'^2 + \cancel{\frac{1}{2}x'^2} + \cancel{x'y'} + \cancel{\frac{1}{2}y'^2} - 6\sqrt{2}x' + 6\sqrt{2}y' + 6\sqrt{2}x' + 6\sqrt{2}y' - 13 = 0$$

Posle skraćivanja dobijamo:

$$2y'^2 + 12\sqrt{2}y' - 13 = 0$$

Dakle, dobili smo kvadratnu jednačinu po  $y'$ . Probamo da li ona ima rešenja...Njena diskriminanta je :

$$D = b^2 - 4ac$$

$$D = (12\sqrt{2})^2 - 4 \cdot 2 \cdot (-13) = 288 + 104 = 392 > 0 \quad 392 = 196 \cdot 2$$

$$y'_{1,2} = \frac{-12\sqrt{2} \pm 14\sqrt{2}}{4} \quad \text{Pa je } y'_1 = \frac{\sqrt{2}}{2} \quad \text{i } y'_2 = \frac{-13\sqrt{2}}{2}$$

Dakle radi se o dvema paralelnim pravama!

4. Jednačinu svesti na kanonski oblik i odrediti koja kriva je njome određena:

$$5x^2 - 2xy + 5y^2 - 4x + 20y + 20 = 0$$

Rešenje:

$$A = 5; B = -1; C = 5; D = -2; E = 10 \quad F = 20$$

$$\left. \begin{array}{l} Aa + Bb + D = 0 \\ Ba + Cb + E = 0 \end{array} \right\} \quad \left. \begin{array}{l} 5a - b - 2 = 0 \\ -a + 5b + 10 = 0 \end{array} \right\} \quad \text{Rešenje je ( 0, -2 )}$$

**Translacija:**

$$\left. \begin{array}{l} x = x' \\ y = y' - 2 \end{array} \right\} \quad \text{Menjamo u datu jednačinu!}$$

$$5x^2 - 2xy + 5y^2 - 4x + 20y + 20 = 0$$

$$5x'^2 - 2x'(y' - 2) + 5(y' - 2)^2 - 4x' + 20(y' - 2) + 20 = 0$$

$$5x'^2 - 2x'y' + 4x' + 5y'^2 - 20y' + 20 - 4x' + 20y' - 40 + 20 = 0 \quad \text{potiremo...}$$

$$5x'^2 - 2x'y' + 5y'^2 = 0$$

**Rotacija :**

Kako je  $A=C$  ugao je  $\alpha = \frac{\pi}{4}$

$$\left. \begin{array}{l} x' = x'' \cos \alpha - y'' \sin \alpha \\ y' = x'' \sin \alpha + y'' \cos \alpha \end{array} \right\} \quad \left. \begin{array}{l} x' = x'' \cos \frac{\pi}{4} - y'' \sin \frac{\pi}{4} \\ y' = x'' \sin \frac{\pi}{4} + y'' \cos \frac{\pi}{4} \end{array} \right\} \quad \begin{array}{l} x' = x'' \frac{\sqrt{2}}{2} - y'' \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} (x'' - y'') \\ y' = x'' \frac{\sqrt{2}}{2} + y'' \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} (x'' + y'') \end{array}$$

$$5x'^2 - 2x'y' + 5y'^2 = 0$$

$$5\left[\frac{\sqrt{2}}{2}(x'' - y'')\right]^2 - 2\frac{\sqrt{2}}{2}(x'' - y'')\frac{\sqrt{2}}{2}(x'' + y'') + 5\left[\frac{\sqrt{2}}{2}(x'' + y'')\right]^2 = 0$$

$$5\frac{2}{4}(x''^2 - 2x''y'' + y''^2) - 2\frac{2}{4}(x''^2 - y''^2) + 5\frac{2}{4}(x''^2 + 2x''y'' + y''^2) = 0 \quad \text{sredimo...}$$

$$4x''^2 + 6y''^2 = 0$$

$2x''^2 + 3y''^2 = 0$  je konačno rešenje, koje predstavlja TAČKU!

5. Jednačinu svesti na kanonski oblik i odrediti koja kriva je njome određena:

$$x^2 + 4xy + 4y^2 + 4x + y - 15 = 0$$

**Rešenje:**

$$A = 1; B = 2; C = 4; D = 2; E = \frac{1}{2}; F = -15$$

$$\left. \begin{array}{l} Aa + Bb + D = 0 \\ Ba + Cb + E = 0 \end{array} \right\} \quad \left. \begin{array}{l} a + 2b + 2 = 0 \\ 2a + 4b + \frac{1}{2} = 0 \end{array} \right\} \quad \text{Nemoguć sistem!} \quad \text{Nema centar!}$$

**Rotacija:**

$$\operatorname{ctg} 2\alpha = \frac{A-C}{2B} \text{ pa je } \operatorname{ctg} 2\alpha = \frac{1-4}{4} \quad \text{to jest} \quad \operatorname{ctg} 2\alpha = -\frac{3}{4}$$

$$\operatorname{ctg} 2\alpha = \frac{\operatorname{ctg}^2 \alpha - 1}{2\operatorname{ctg} \alpha} \quad \text{to jest} \quad \frac{\operatorname{ctg}^2 \alpha - 1}{2\operatorname{ctg} \alpha} = \frac{-3}{4} \quad \text{pa je odavde} \quad 2\operatorname{ctg}^2 \alpha + 3\operatorname{ctg} \alpha - 2 = 0$$

$$2\operatorname{ctg}^2 \alpha + 3\operatorname{ctg} \alpha - 2 = 0 \quad \text{smena} \quad \operatorname{ctg} \alpha = t$$

$$2t^2 + 3t - 2 = 0 \quad \text{kvadratna po } t, \text{ a njena rešenja su: } t_1 = \frac{1}{2}; \quad t_2 = -2; \text{ vratimo se u smenu } \operatorname{ctg} \alpha = t$$

$$\underline{\text{Za } \operatorname{ctg} \alpha = \frac{1}{2}}$$

$$\text{Iskoristićemo formule } \operatorname{ctg} \alpha = \frac{\cos \alpha}{\sin \alpha} \quad \text{i} \quad \sin^2 \alpha + \cos^2 \alpha = 1$$

$$\frac{\cos \alpha}{\sin \alpha} = \frac{1}{2} \quad \text{pa je } 2\cos \alpha = \sin \alpha \quad \text{i} \quad \text{to zamenimo u } \sin^2 \alpha + \cos^2 \alpha = 1$$

$$4\cos^2 \alpha + \cos^2 \alpha = 1$$

$$5\cos^2 \alpha = 1$$

$$\cos \alpha = \pm \frac{1}{\sqrt{5}} \quad \text{vratimo se u } 2\cos \alpha = \sin \alpha \quad \text{pa je} \quad \sin \alpha = \pm \frac{2}{\sqrt{5}}$$

$$\text{Dakle odavde su rešenja: } (\sin \alpha, \cos \alpha) = \left(+\frac{2}{\sqrt{5}}, +\frac{1}{\sqrt{5}}\right) \quad \text{i} \quad (\sin \alpha, \cos \alpha) = \left(-\frac{2}{\sqrt{5}}, -\frac{1}{\sqrt{5}}\right)$$



Za  $\operatorname{ctg} \alpha = -2$

Koristeći isti postupak dobijamo rešenja :

$$(\sin \alpha, \cos \alpha) = \left(+\frac{1}{\sqrt{5}}, -\frac{2}{\sqrt{5}}\right) \quad \text{i} \quad (\sin \alpha, \cos \alpha) = \left(-\frac{1}{\sqrt{5}}, +\frac{2}{\sqrt{5}}\right)$$

Rešenje koje ćemo mi uzeti je  $(\sin \alpha, \cos \alpha) = \left(+\frac{2}{\sqrt{5}}, +\frac{1}{\sqrt{5}}\right)$

Rotacija:

$$\left. \begin{array}{l} x = x' \cos \alpha - y' \sin \alpha \\ y = x' \sin \alpha + y' \cos \alpha \end{array} \right\} \left. \begin{array}{l} x = \frac{1}{\sqrt{5}} x' - \frac{2}{\sqrt{5}} y' \\ y = \frac{2}{\sqrt{5}} x' + \frac{1}{\sqrt{5}} y' \end{array} \right\} \left. \begin{array}{l} x = \frac{1}{\sqrt{5}} (x' - 2y') \\ y = \frac{1}{\sqrt{5}} (2x' + y') \end{array} \right\} \text{ menjamo u:}$$

$$x^2 + 4xy + 4y^2 + 4x + y - 15 = 0$$

$$\left[\frac{1}{\sqrt{5}}(x' - 2y')\right]^2 + 4\frac{1}{\sqrt{5}}(x' - 2y')\frac{1}{\sqrt{5}}(2x' + y') + 4\left[\frac{1}{\sqrt{5}}(2x' + y')\right]^2 + 4\frac{1}{\sqrt{5}}(x' - 2y') + \frac{1}{\sqrt{5}}(2x' + y') - 15 = 0$$

Sve ovo lepo sredimo, skratimo šta ima, i dobijamo:

$$5x'^2 + \frac{5}{\sqrt{5}}x' - \frac{7}{\sqrt{5}}y' - 15 = 0 \quad \text{sve podelimo sa 5}$$

$$x'^2 + \frac{1}{\sqrt{5}}x' - \frac{7}{5\sqrt{5}}y' - 5 = 0 \quad \text{sad vršimo dopunu do punog kvadrata...( po x')}$$

$$x'^2 + \frac{1}{\sqrt{5}}x' + \left(\frac{1}{2\sqrt{5}}\right)^2 - \left(\frac{1}{2\sqrt{5}}\right)^2 - \frac{7}{5\sqrt{5}}y' - 5 = 0 \quad \text{prva tri daju pun kvadrat!}$$

$$\left(x' + \frac{1}{2\sqrt{5}}\right)^2 = \frac{7}{5\sqrt{5}}y' + \frac{61}{20} \quad \text{izvučemo } \frac{7}{5\sqrt{5}} \text{ kao zajednički na desnoj strani...}$$

$$(x' + \frac{1}{2\sqrt{5}})^2 = \frac{7}{5\sqrt{5}} (y' + \frac{61}{20} / \frac{7}{5\sqrt{5}}) \quad \text{malo sredimo}$$

$$(x' + \frac{1}{2\sqrt{5}})^2 = \frac{7}{5\sqrt{5}} (y' + \frac{61}{4} / \frac{7}{\sqrt{5}})$$

$$(x' + \frac{1}{2\sqrt{5}})^2 = \frac{7}{5\sqrt{5}} (y' + \frac{61\sqrt{5}}{28})$$

**SAD IZVRŠIMO TRANSLACIJU: (napravili smo šta je  $x''$  i  $y''$  )**

$$x'' = x' + \frac{1}{2\sqrt{5}}$$

$$y'' = y' + \frac{61\sqrt{5}}{28}$$

**Tako da sada kriva postaje:**

$$x''^2 = \frac{7}{5\sqrt{5}} y'' \quad \text{a ovo je parabola!}$$

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