Slide 1:

Hi Kenz, Brooke & Lydia ♡

Here!

SydDrew M. Jeraldwa ♡

was → there

#iDrew!

hehe

Hi Lyd ;)

Slide 2:

9-4　　　Rotation of Conics

Ex 1　Classify the graph of each equation

a.　$x^2 - 3y^2 - 4x + 1 = 0$

hyperbola

b.　$x^2 + y^2 - 10x + 2y + 22 = 0$

circle

c.　$x^2 - 4x - 24y - 4 = 0$

parabola

d.　$2x^2 + 3y^2 - 28x - 12y + 104 = 0$

ellipse

Slide 3:

General equation of a conic section:　$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$

Discriminant:

$B^2 - 4AC = 0$　parabola

$B^2 - 4AC < 0$　ellipse

$B^2 - 4AC > 0$　hyperbola

Slide 4:

Ex 2　Classify each conic:

$x^2 - 4xy + y^2 + 2x - 3y + 1 = 0$
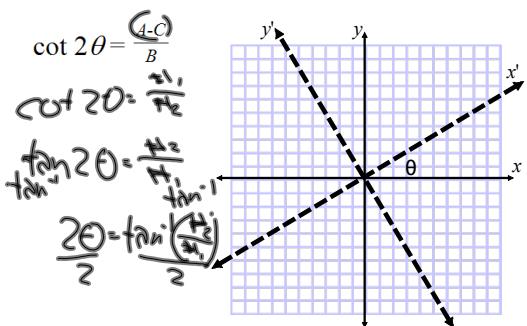
$(-4)^2 - 4(1)(1) = 12 > 0 = $ hyperbola

$4x^2 - xy + y^2 + 2x - 3y + 1 = 0$

$(-1)^2 - 4(4)(1) = -15 < 0$ ellipse

$x^2 - xy + 4y^2 + 2x - 3y + 1 = 0$

$(-1)^2 - 4(4)(1) = -15 < 0$ Ellipse

$x^2 - 4xy + 4y^2 + 2x - 3y + 1 = 0$

$(-4)^2 - 4(1)(4) = 16 - 16 = 0$ parabola

Slide 5:

The conic rotates through θ where:

$$\cot 2\theta = \frac{A-C}{B}$$

$\cot 2\theta = \frac{A_1}{A_2}$

$\tan 2\theta = \frac{A_2}{A_1}$

$2\theta = \tan^{-1}\left(\frac{A_2}{A_1}\right)$

Slide 6:

Ex 3　Find the angle of rotation of each:

$x^2 - 4xy + y^2 + 2x - 3y + 1 = 0$

$\cot 2\theta = \frac{0}{-4} = \frac{0}{4}$　$\tan 2\theta = $ undefined

$\to 2\theta = 90°$

$4x^2 - xy + y^2 + 2x - 3y + 1 = 0$

$\cot 2\theta = \frac{3}{-1} = \frac{-3}{1}$　$\tan 2\theta = \frac{1}{3}$　$\theta = 45°$

$x^2 - xy + 4y^2 + 2x - 3y + 1 = 0$

$\cot 2\theta = \frac{-3}{-1} = \frac{3}{1}$　$\tan 2\theta = \frac{1}{3}$　$\theta = 9.2°$

$x^2 - 4xy + 4y^2 + 2x - 3y + 1 = 0$

$\cot 2\theta = \frac{-3}{-4} = \frac{3}{4}$　$\tan 2\theta = \frac{4}{3}$

$\theta = 26.6°$

$2\theta = 180 - ?$

$\theta = 81°$

1

Homework
p.697
#3-14, 27-34
Classify each conic and find the angle of rotation.

May 8-9:10 AM