

Rotations of Conic Sections

Date _____ Period _____

Classify each conic section.

1) $-u^2 + 2uv - v^2 + \sqrt{2} \cdot u + \sqrt{2} \cdot v = 0$

2) $37u^2 + 70uv + 37v^2 - 72 = 0$

3) $u^2 - 14uv + v^2 - 120 = 0$

4) $13u^2 + 10uv + 13v^2 - 288 = 0$

Transform each equation from the xy -plane to the rotated uv -plane. The uv -plane's angle of rotation is provided.

5) $x^2 + y = 0, \theta = 60^\circ$

6) $x^2 + 4y^2 - 36 = 0, \theta = 30^\circ$

7) $\frac{x^2}{16} + \frac{y^2}{36} = 1, \theta = 30^\circ$

8) $\frac{x^2}{16} - \frac{y^2}{16} = 1, \theta = 45^\circ$

Eliminate the cross-product term by determining an angle of rotation between 0° and 90° and transforming the equation from the xy -plane to the rotated uv -plane.

9) $37x^2 + 42\sqrt{3} \cdot xy + 79y^2 - 400 = 0$

10) $11x^2 + 10\sqrt{3} \cdot xy + y^2 - 64 = 0$

Rotations of Conic Sections

Classify each conic section.

1) $-u^2 + 2uv - v^2 + \sqrt{2} \cdot u + \sqrt{2} \cdot v = 0$

Parabola

2) $37u^2 + 70uv + 37v^2 - 72 = 0$

Ellipse

3) $u^2 - 14uv + v^2 - 120 = 0$

Hyperbola

4) $13u^2 + 10uv + 13v^2 - 288 = 0$

Ellipse

Transform each equation from the xy -plane to the rotated uv -plane. The uv -plane's angle of rotation is provided.

5) $x^2 + y = 0, \theta = 60^\circ$

$u^2 - 2\sqrt{3} \cdot uv + 3v^2 + 2\sqrt{3} \cdot u + 2v = 0$

6) $x^2 + 4y^2 - 36 = 0, \theta = 30^\circ$

$7u^2 + 6\sqrt{3} \cdot uv + 13v^2 - 144 = 0$

7) $\frac{x^2}{16} + \frac{y^2}{36} = 1, \theta = 30^\circ$

$31u^2 - 10\sqrt{3} \cdot uv + 21v^2 - 576 = 0$

8) $\frac{x^2}{16} - \frac{y^2}{16} = 1, \theta = 45^\circ$

$-2uv - 16 = 0$

Eliminate the cross-product term by determining an angle of rotation between 0° and 90° and transforming the equation from the xy -plane to the rotated uv -plane.

9) $37x^2 + 42\sqrt{3} \cdot xy + 79y^2 - 400 = 0$

$25u^2 + 4v^2 - 100 = 0, \theta = 60^\circ$

10) $11x^2 + 10\sqrt{3} \cdot xy + y^2 - 64 = 0$

$4u^2 - v^2 - 16 = 0, \theta = 30^\circ$