Name_____

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) $x^2 + y = 0, \ \theta = 60°$

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

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

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

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) $x^2 + y = 0, \ \theta = 60°$

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

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

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

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

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

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

   $-2uv - 16 = 0$

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

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

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

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