

HW # 9.4-1

① $y^2 - 4x + 2y + 21 = 0$
 $B^2 - 4Ac = 0 - 4 \cdot 1 \cdot 0 = 0$

PARABOLA

③ $4x^2 - 9y^2 - 8x - 36y - 68 = 0$

$B^2 - 4Ac = 0 - 4 \cdot 4 \cdot (-9) > 0$

HYPERBOLA

④ $9x^2 + 25y^2 - 54x - 200y + 256 = 0$

$B^2 - 4Ac = 0 - 4 \cdot 9 \cdot 25 < 0$

ELLIPSE

⑤ $4x^2 + 4y^2 + 12x + 4y + 1 = 0$

$B^2 - 4Ac = 0 - 4 \cdot 4 \cdot 4 < 0$

ELLIPSE → circle

⑬ $x^2 + 4xy + y^2 - 3 = 0$

$16 - 4 \cdot 1 \cdot 1 > 0$

HYPERBOLA

$\tan 2\theta = \frac{4}{1-1} = \text{undefined}$

$2\theta = 90^\circ$

$\theta = 45^\circ$

$x = \frac{\sqrt{2}}{2} x' - \frac{\sqrt{2}}{2} y' = \frac{\sqrt{2}x' - \sqrt{2}y'}{2}$

$y = \frac{\sqrt{2}}{2} x' + \frac{\sqrt{2}}{2} y' = \frac{\sqrt{2}x' + \sqrt{2}y'}{2}$

⑱ ELLIPSE

$\theta = 45^\circ$

$x = \frac{\sqrt{2}x' - \sqrt{2}y'}{2}, y = \frac{\sqrt{2}x' + \sqrt{2}y'}{2}$

⑲ HYPERBOLA

$\tan 2\theta = \frac{10\sqrt{3}}{10} = \sqrt{3}$

$2\theta = 60^\circ$

$\theta = 30^\circ$

$x = \frac{\sqrt{3}}{2} x' - \frac{1}{2} y' = \frac{\sqrt{3}x' - y'}{2}$

$y = \frac{1}{2} x' + \frac{\sqrt{3}}{2} y' = \frac{x' + \sqrt{3}y'}{2}$