IDENTIFYING CONICS

1) Identify conics from equation
2) Solve quadratic systems of eq.

P 1) $x = 5 - 3(y+2)^2$

H 2) $\frac{x^2}{9} - \frac{(y+3)^2}{4} = 1$

E 3) $\frac{x^2}{9} + \frac{(y-2)^2}{4} = 1$

C 4) $\frac{x^2}{9} + \frac{(y-2)^2}{9} = 1$

E 5) $3x^2 + 7x - 4y + 2y^2 = 11$

P 6) $2x^2 - 5y = 3x + 14 - 3x^2$

H 7) $9x^2 - 2x + 1 = 3y^2 + 2y$
$9x^2 - 3y^2$

C 8) $2 - 4y + 7y^2 = 5x + 3 - 7x^2$
$7x^2 + 7y^2$

DO NOT WRITE THESE RULES ON YOUR CARD!

Parabola – one squared variable

Hyperbola – two squared vars with opposite signs

Circles – two squared vars, same signs, same coeff.

Ellipses – two squared vars, same signs, different coeff.

Solving Systems of Quadratic Equations

H $5x^2 - 3y^2 = -28$

E $3[2x^2 + y^2 = 24]$

Elimination--Variables must have the same exponents.

$5x^2 - 3y^2 = -28$

$6x^2 + 3y^2 = 72$

$11x^2 = 44$

$\frac{11x^2}{11} = \frac{44}{11}$

$\sqrt{x^2} = \sqrt{4}$

$x = \pm 2$

$2x^2 + y^2 = 24$

$2(2)^2 + y^2 = 24$

$8 + y^2 = 24$

$-8 \quad -8$

$\sqrt{y^2} = \sqrt{16}$

$y = \pm 4$

$(2, 4)$
$(2, -4)$
$(-2, 4)$
$(-2, -4)$

$x^2 - 2x = 3$

$x^2 - 2x - 3 = 0$

$(x \ \ 3)(x \ 1) = 0$

$x^2 + 9y^2 = 25$

$2y = 1 - x$

$x = 1 - 2y$

$(1-2y)^2 + 4y^2 = 25$

FOIL!

$(1-2y)(1-2y) + 4y^2 = 25$

$1 - 2y - 2y + 4y^2 + 4y^2 = 25$

$-25 \qquad -25$

$8y^2 - 4y - 24 = 0$

$4(2y^2 - y - 6) = 0$

$4(2y+3)(y-2) = 0$

$+3y \qquad -4y$

$2y + 3 = 0 \qquad y - 2 = 0$

$2y = -3 \qquad y = 2$

$y = -3/2$

Substitution--Variables do NOT have the same exponents.

KEY: Isolate a variable which has no exponent!

$1^2 + 2^2 = 3^2$

$1 + 4 = 9$

$x = 1 - 2y$

$y = -3/2$

$x = 1 + 2(+3/2) = 4$

$y = 2$

$x = 1 - 2(2) = -3$

$(4, -3/2) \quad (-3, 2)$

No solution

Variables will cancel

$x^2 + 4 = x^2 - 8$

$4 = -8$

$\sqrt{x^2} = \sqrt{-7}$

imaginary = no sol.

Infinitely Many

Variables cancel

$7 = 7$

$0 = 0$