

IDENTIFYING CONICS

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) $\frac{9x^2 - 2x + 1}{9x^2 - 3y^2} = \frac{3y^2 + 2y}{0}$

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

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

DO NOT WRITE THESE RULES ON YOUR CARD!

Parabola - 1 squared variable

Hyperbola - 2 squared vars
 with opposite signs

Ellipse - 2 squared vars,
 same signs,
 different coeff

Circle - 2 squared vars,
 same signs,
 same coeff.

Solving Systems of Quadratic Equations

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

$$E3 \quad [2x^2 + y^2 = 24]$$

$$\begin{array}{r}
 5x^2 - 3y^2 = -28 \\
 + \quad 6x^2 + 3y^2 = 72 \\
 \hline
 11x^2 \qquad \qquad = 44 \\
 \hline
 11 \qquad \qquad \sqrt{x^2} = \sqrt{4} \\
 \qquad \qquad \qquad x = \pm 2
 \end{array}$$

$$x = \pm 2$$

$$\begin{array}{l}
 (2, 4) \\
 (2, -4) \\
 (-2, 4) \\
 (-2, -4)
 \end{array}$$

Elimination--Variables must have the same exponents.

$$\begin{array}{l}
 \text{X} \\
 2x^2 + y^2 = 24 \\
 x=2 \quad 2(2)^2 + y^2 = 24 \\
 8 + y^2 = 24 \\
 \sqrt{y^2} = \sqrt{16} \\
 y = \pm 4
 \end{array}$$

$$\text{E11 } x^2 + 4y^2 = 25$$

$$\text{Line } 2y = 1 - x$$

$$x = 1 - 2y$$

i) Isolate

Substitution--Variables do NOT have the same exponents.

KEY: Isolate a variable which has no exponent!

FULLY

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

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

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

$$8y^2 - 4y + 1 = 25$$

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

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

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

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

$$2y = -3$$

$$y = -3/2$$

$$y = 2$$

$$x = 1 - 2y$$

$$y = 2 \quad x = 1 - 2(2)$$

$$x = -3$$

$$y = -3/2$$

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

$$x = 4$$

$$\begin{pmatrix} -3, 2 \\ 4, -3/2 \end{pmatrix}$$

No solution

Variables will cancel

$$\cancel{x^2} + 4 = \cancel{x^2} - 8$$

$$4 = -8$$

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

imaginary = no sol.

Infinitely Many

Variables cancel

$$7 = 7$$

$$0 = 0$$

