

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

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

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

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

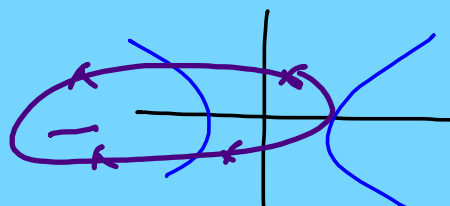
$$\begin{aligned} H & 5x^2 - 3y^2 = -28 \\ E & 3[2x^2 + y^2 = 24] \end{aligned}$$

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

$$\begin{aligned} \sqrt{x^2} &= \sqrt{4} \\ x &= \pm 2 \end{aligned}$$

$$\begin{aligned} x^2 - 2x &= 3 \\ x^2 - 2x - 3 &= 0 \\ (x - 3)(x + 1) &= 0 \end{aligned}$$

Elimination--Variables must have the same exponents.



$$\begin{aligned} 2x^2 + y^2 &= 24 \\ 2(2)^2 + y^2 &= 24 \\ 8 + y^2 &= 24 \\ y^2 &= 16 \\ y &= \pm 4 \end{aligned}$$

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

$$x^2 + 4y^2 = 25$$

$$2y = 1 - x$$

$$x = 1 - 2y$$

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

FOIL!

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

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

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

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

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

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

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

$$y = -3/2$$

Substitution--Variables do NOT have the same exponents.

KEY: Isolate a variable which has no exponent!

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

$$1 + 4 = 9$$

$$x = 1 - 2y$$

$$y = -3/2$$

$$x = 1 + 2\left(\frac{3}{2}\right) = 4$$

$$y = 2$$

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

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

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

$$7 = 7$$

$$0 = 0$$