Systems of Conics WS 2
Linear & Quadratic

Name Fuston

Solve the system algebraically.

1. $x^2 + y^2 = 8$
$y = x$

$x^2 + x^2 = 8$
$2x^2 = 8$
$x^2 = 4$
$x = 2 \mid x = -2$
$y = 2 \mid y = -2$

(2, 2)
(-2, -2)

2. $x^2 - 2x + 3y - 11 = 0$
$y = x + 3$

$x^2 - 2x + 3(x+3) - 11 = 0$
$x^2 - 2x + 3x + 9 - 11 = 0$
$x^2 + x - 2 = 0$
$(x+2)(x-1) = 0$
$x = -2 \mid x = 1$
$y = -2+3 \mid y = 1+3$

(-2, 1)
(1, 4)

3. $2x^2 + 4y^2 = 54$
$y = -x$

$2x^2 + 4(-x)^2 = 54$
$2x^2 + 4x^2 = 54$
$6x^2 = 54$
$x^2 = 9$
$x = 3 \mid x = -3$
$y = -3 \mid y = 3$

(3, -3)
(-3, 3)

4. $x^2 - y^2 = 24$
$y = x - 2$

$x^2 - (x-2)^2 = 24$
$x^2 - (x^2 - 4x + 4) = 24$
$x^2 - x^2 + 4x - 4 = 24$
$4x = 28$
$x = 7$
$y = 7 - 2$

(7, 5)

5. $5x^2 + 3y^2 = 17$
$y - x = -1 \longrightarrow y = x - 1$

$5x^2 + 3(x-1)^2 = 17$
$5x^2 + 3(x^2 - 2x + 1) = 17$
$5x^2 + 3x^2 - 6x + 3 = 17$
$8x^2 - 6x - 14 = 0$
$4x^2 - 3x - 7 = 0$
$(4x - 7)(x + 1) = 0$
$x = 7/4 \quad x = -1$

(-1, -2)
(7/4, 3/4)

6. $y^2 - 2x^2 = 6$
$y = -2x$

$(-2x)^2 - 2x^2 = 6$
$4x^2 - 2x^2 = 6$
$2x^2 = 6$
$x^2 = 3$
$x = \sqrt{3} \mid x = -\sqrt{3}$
$y = -2\sqrt{3} \mid x = 2\sqrt{3}$

$(\sqrt{3}, -2\sqrt{3})$
$(-\sqrt{3}, 2\sqrt{3})$

Answers: 1. (2, 2)(-2, -2) 2. (-2, 1)(1, 4) 3. (3, -3)(-3, 3)
4. (7, 5) 5. (-1, -2)(7/4, 3/4) 6. (√3, -2√3)(-√3, 2√3)