

Solve the system algebraically.

1. $x^2 + y^2 = 8$
 $y = x$
 $x^2 + x^2 = 8$
 $2x^2 = 8$
 $x^2 = 4$
 $x = \pm 2$

$x = 2$	$x = -2$
$y = 2$	$y = -2$
$(2, 2)$	$(-2, -2)$

2. $x^2 - 2x + 3y - 11 = 0$
 $y = x + 3$
 $x^2 - 2x + 3(x + 3) - 11 = 0$
 $x^2 - 2x + 3x + 9 - 11 = 0$
 $x^2 + x - 2 = 0$
 $(x + 2)(x - 1) = 0$
 $x = -2, 1$

$x = 2$	$x = 1$
$y = -2 + 3$	$y = 1 + 3$
$y = 1$	$y = 4$
$(-2, 1)$	$(1, 4)$

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

$x = 3$	$x = -3$
$y = -3$	$y = -(-3)$
$y = 3$	$y = 3$
$(3, -3)$	$(-3, 3)$

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

$x = 7$
$y = 7 - 2$
$y = 5$
$(7, 5)$

5. $5x^2 + 3y^2 = 17$
 $y - x = -1 \Rightarrow y = x - 1$
 $5x^2 + 3(x - 1)^2 = 17$
 $5x^2 + 3(x^2 - 2x + 1) = 17$
 $5x^2 + 3x^2 - 6x + 3 = 17$
 $8x^2 - 6x - 14 = 0$
 $4x^2 - 3x - 7 = 0$
 $(4x - 7)(x + 1) = 0$
 $x = \frac{7}{4}, -1$

$x = \frac{7}{4}$	$x = -1$
$y = \frac{7}{4} - 1$	$y = -1 - 1$
$y = \frac{3}{4}$	$y = -2$
$(\frac{7}{4}, \frac{3}{4})$	$(-1, -2)$

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

$x = \sqrt{3}$	$x = -\sqrt{3}$
$y = -2\sqrt{3}$	$y = -2(-\sqrt{3})$
$y = -2\sqrt{3}$	$y = 2\sqrt{3}$
$(\sqrt{3}, -2\sqrt{3})$	$(-\sqrt{3}, 2\sqrt{3})$

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