

Solve the system algebraically.

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

② $x = 2 \mid x = -2$
 $y = 2 \mid y = -2$

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

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

② $x = -2 \mid x = 1$
 $y = -2 + 3 \mid y = 1 + 3$
 $y = 1 \mid y = 4$

$(x+2)(x-1) = 0$
 $x = -2, 1$

$(-2, 1) (1, 4)$

3. $2x^2 + 4y^2 = 54$ ① $2x^2 + 4(-x)^2 = 54$
 $y = -x$
 ↓ use
 $2x^2 + 4x^2 = 54$
 $6x^2 = 54$

② $x = 3 \mid x = -3$
 $y = -3 \mid y = -(-3)$
 $y = 3$

$x^2 = 9$
 $x = \pm 3$

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

4. $x^2 - y^2 = 24$ ① $x^2 - (x-2)^2 = 24$
 $y = x - 2$
 ↓ use
 $x^2 - (x^2 - 4x + 4) = 24$
 $x^2 - x^2 + 4x - 4 = 24$

② $x = 7$
 $y = 7 - 2$
 $y = 5$

$4x = 28$
 $x = 7$

$(7, 5)$

5. $5x^2 + 3y^2 = 17$ ② $5x^2 + 3(x-1)^2 = 17$
 $y - x = -1$
 ① $y = x - 1$
 ↓ use
 $5x^2 + 3(x^2 - 2x + 1) = 17$
 $5x^2 + 3x^2 - 6x + 3 = 17$

③ $x = \frac{7}{4} \mid x = -1$
 $y = \frac{7}{4} - 1 \mid y = -1 - 1$
 $y = \frac{3}{4} \mid y = -2$

$8x^2 - 6x - 14 = 0$
 $2(4x^2 - 3x - 7) = 0$
 $2(4x - 7)(x + 1) = 0$
 $x = \frac{7}{4} \mid x = -1$

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

6. $y^2 - 2x^2 = 6$ ① $(-2x)^2 - 2x^2 = 6$
 $y = -2x$
 ↓ use
 $4x^2 - 2x^2 = 6$
 $2x^2 = 6$
 $x^2 = 3$

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

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

- Answers: 1. $(2, 2)(-2, -2)$ 2. $(-2, 1)(1, 4)$ 3. $(3, -3)(-3, 3)$
 4. $(7, 5)$ 5. $(-1, -2)(\frac{7}{4}, \frac{3}{4})$ 6. $(\sqrt{3}, -2\sqrt{3})(-\sqrt{3}, 2\sqrt{3})$