Solving Linear-Quadratic Systems

Algebra 1 •Section 6.6

Name: _____	Date: _____	Score: _____ / 12

Quick Review and Helpful Hints

A system asks for values that satisfy every relationship at the same time. The solution may be one point, no point, or infinitely many points, depending on how the graphs or equations meet.

▷ **Example:** Solve $y = x + 4$ and $y = 10$.
Work: Substitute 10 for y: $10 = x + 4$, so $x = 6$. The solution is the point where both equations agree.

★ **Answer:** $(6, 10)$

Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Solve $y = x^2$ and $y = 4$.

2. Solve $y = x^2 + 1$ and $y = 10$.

3. Solve $y = x^2$ and $y = x + 2$.

4. Solve $y = x^2 - 4$ and $y = 0$.

5. Solve $y = -x^2 + 9$ and $y = 5$.

6. Solve $y = x^2 + 2x$ and $y = 0$.

7. Solve $y = x^2$ and $y = 2x + 3$.

8. How many intersections can a line and parabola have?

9. Solve $y = x^2 - 1$ and $y = 3$.

10. Solve $y = 2x^2$ and $y = 8$.

Word Problems

11. A ball height is $h = -t^2 + 4t + 5$ and a platform is at $h = 5$. When do they meet?

12. A parabola $y = x^2$ and line $y = 6x - 8$ model two paths. Find intersections.

Answer Keys

1. $(-2, 4)$ and $(2, 4)$
2. $(-3, 10)$ and $(3, 10)$
3. $(-1, 1)$ and $(2, 4)$
4. $(-2, 0)$ and $(2, 0)$
5. $(-2, 5)$ and $(2, 5)$
6. $(-2, 0)$ and $(0, 0)$
7. $(-1, 1)$ and $(3, 9)$
8. 0, 1, or 2
9. $(-2, 3)$ and $(2, 3)$
10. $(-2, 8)$ and $(2, 8)$
11. $t = 0$ and $t = 4$
12. $(2, 4)$ and $(4, 16)$

Step-by-Step Explanations

1. Both equal y, so $x^2 = 4$ — and squaring either -2 or 2 lands you on 4.

2. Where they meet, $x^2 + 1 = 10$, so peel off the 1 to find $x^2 = 9$.

3. Match the y's: $x^2 = x + 2$. Slide everything left and factor to catch both crossings.

4. Setting $y = 0$ asks where the parabola hits the x-axis, so solve $x^2 = 4$.

5. Equal heights mean $-x^2 + 9 = 5$; tidy it up and $x^2 = 4$ pops right out.

6. A product equals zero only when a piece is zero, so factor $x(x + 2)$ and read off both roots.

7. Curve meets line when $x^2 = 2x + 3$; move it all to one side and the quadratic gives two answers.

8. Picture sliding a line across a parabola — it can sail past, just graze it, or slice clean through twice.

9. At the meeting point $x^2 - 1 = 3$; add the 1 back over and you get $x^2 = 4$.

10. Equal y-values give $2x^2 = 8$; divide by 2 first and $x^2 = 4$ is left.

11. The ball is level with the platform when $-t^2 + 4t = 0$; factor out $-t$ to find both times.

12. The paths cross where $x^2 = 6x - 8$; gather terms and factor to find the two spots they share.

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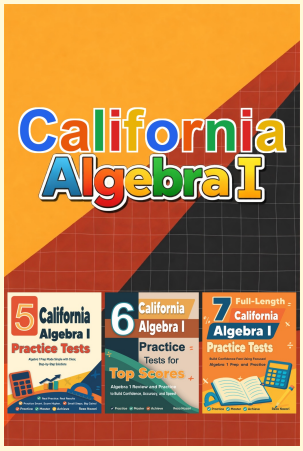

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