Name ______________________ Class ____________ Date ____________

Practice

Form G

Systems of Linear and Quadratic Equations

Solve each system by graphing.

1. $y = x^2 + 2$
$y = x + 2$
(0, 2); (1, 3)

2. $y = x^2$
$y = 2x$
(0, 0); (2, 4)

3. $y = x^2 - 5$
$y = x - 3$
(−1, −4); (2, −1)

4. $y = x^2 + 1$
$y = x + 1$
(0, 1); (1, 2)

5. $y = x^2 - 4x - 2$
$y = -x - 2$
(0, −2); (3, −5)

6. $y = x^2 - 6x - 7$
$y = x + 1$
(−1, 0); (8, 9)

Solve each system using elimination.

7. $y = x^2$
$y = x + 2$
(−1, 1); (2, 4)

8. $y = x^2 - 4$
$y = -x - 2$
(−2, 0); (1, −3)

9. $y = x^2 - 2x + 2$
$y = 2x - 2$
(2, 2)

10. $y = -x^2 + 4x - 3$
$y = -x + 1$
(1, 0); (4, −3)

11. $y = -x^2 + 2x + 4$
$y = -x + 4$
(0, 4); (3, 1)

12. $y = x^2 - x - 6$
$y = 2x - 2$
(−1, −4); (4, 6)

13. The weekly profits of two different companies selling similar items that opened for business at the same time are modeled by the equations shown below. The profit is represented by y and the number of weeks the companies have been in business is represented by x. According to the projections, what week(s) did the companies have the same profit? What was the profit of both companies during the week(s) of equal profit?
Company A: $y = x^2 - 70x + 3341$
Company X: $y = 50x + 65$ weeks 42 and 78; wk 42: $2165 profit; wk 78: $3965 profit

14. The populations of two different cities are modeled by the equations shown below. The population (in thousands) is represented by y and the number of years since 1970 is represented by x. What year(s) did the cities have the same population? What was the population of both cities during the year(s) of equal population?
Baskinville: $y = x^2 - 22x + 350$
Cryersport: $y = 55x - 950$ yrs 1995 and 2022; in 1995: 425,000 people; in 2022: 1,910,000 people

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Practice (continued) *Form G*

Systems of Linear and Quadratic Equations

Solve each system using substitution.

15. $y = x^2 + x - 60$
$y = 2x - 4$
(−7, −18); (8, 12)

16. $y = x^2 - 3x + 7$
$y = 4x - 3$
(2, 5); (5, 17)

17. $y = x^2 - 2x - 5$
$y = x - 5$
(0, −5); (3, −2)

18. $y = -x^2 - 2x - 4$
$7x + y = 2$
(2, −12); (3, −19)

19. $y = x^2 + 6x$
$x - y = 4$
(−4, −8); (−1, −5)

20. $y = x^2 + 4x - 15$
$y - 25 = x$
(−8, 17); (5, 30)

Solve each system using a graphing calculator.

21. $y = x^2 + 5x + 13$
$y = -5x + 3$
(−1.13, 8.64); (−8.87, 47.36)

22. $y = x^2 - x + 82$
$y = -2x + 50$
no solution

23. $y = x^2 - 12x + 150$
$y = 15x - 20$
(10, 130); (17, 235)

24. $y = x^2 - 2x + 2.5$
$y = 2x - 1.25$
(1.5, 1.75); (2.5, 3.75)

25. $y = x^2 - 0.9x - 1$
$y = 0.5x + 0.76$
(−0.8, 0.36); (2.2, 1.86)

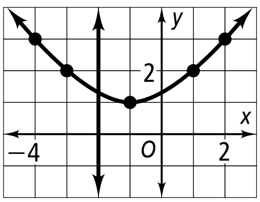
26. $y = x^2 - 68$
$y = -5x + 25.75$
(7.5, −11.75); (−12.5, 88.25)

27. Reasoning What are the solutions of the system $y = 2x^2 - 11$ and $y = x^2 + 2x - 8$? Explain how you solved the system.

Set the equations equal: $2x^2 - 11 = x^2 + 2x - 8$
Simplify to get 0 on one side: $x^2 - 2x - 3 = 0$
Factor: $(x - 3)(x + 1) = 0$
The solutions are (−1, −9) and (3, 7).

28. Writing Explain why a system of linear and quadratic equations can only have 0, 1, or two possible solutions.

The solutions for the system are the points where the graphs intersect. They can intersect at 0, 1, or 2 points. There is no way to intersect a line and parabola at more than two points.



29. Reasoning The graph at the right shows a quadratic function and the linear function $x = b$.

a. How many solutions does this system have? **one solution**

b. If the linear function were changed to $y = b$, how many solutions would the system have? **none**

c. If the linear function were changed to $y = b + 3$, how many solutions would the system have? **one, at the parabola's vertex.**