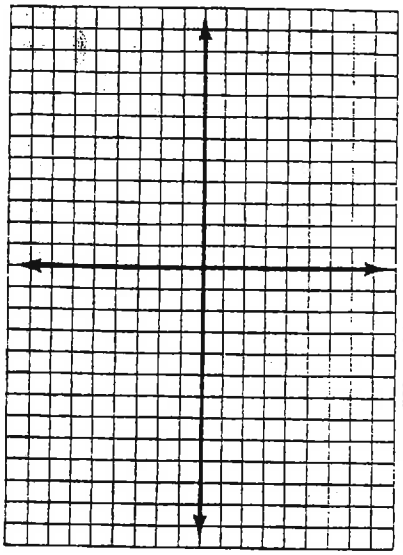
Name_____ Class _____ Date Alg 2

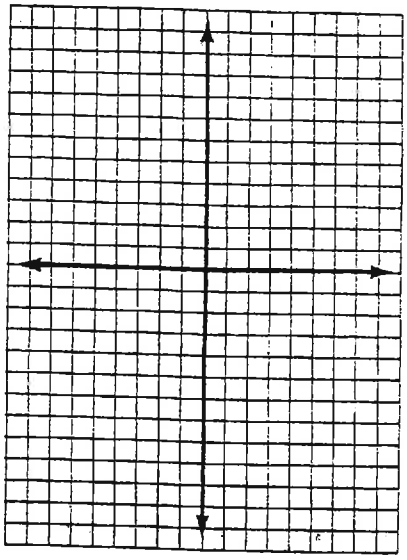
Lesson 3-1

Solve each system by graphing.

1. $\begin{cases} y = 2x + 1 \\ y = 4x - 5 \end{cases}$



2. $\begin{cases} y = -x + 4 \\ y = -2x + 3 \end{cases}$



3-4 Write and solve a SYSTEM

3. Carla has \$2.40 in nickels and dimes. Deron has \$5.50 in dimes and quarters. Deron has as many dimes as Carla has nickels and as many quarters as Carla has dimes. How many of each kind of coin does Carla have?

Let x=

y=

4. Mr. Chandra bought 2 lbs of cheddar cheese and 3 lbs of chicken loaf. He paid \$26.35. Mrs. Hsing paid \$18.35 for 1.5 lbs of cheese and 2 lbs of chicken loaf. What was the price per pound of each item?

Let x=

y=

Solve each system of equations.

5. $\begin{cases} x+y=5 \\ x-y=-3 \end{cases}$ **6.** $\begin{cases} y=3x-1 \\ 2x+y=14 \end{cases}$ **7.** $\begin{cases} 3x+2y=12 \\ x+y=3 \end{cases}$

8-9 Write and solve a system of equations.

8. A kayaker can paddle 12 mi in 2 h moving with the river current. Paddling at the same pace, the trip back against the current takes 4 h. Assume that the river current is constant. Find what the kayaker's speed would be in still water.

Let x=

Let y=

9. Mrs. Mitchell put a total of $10,000 into two accounts. One account earns 6% simple annual interest. The other account earns 6.5% simple interest. After 1 year, the two accounts earned $632.50 interest. Find how much money was invested in each account.

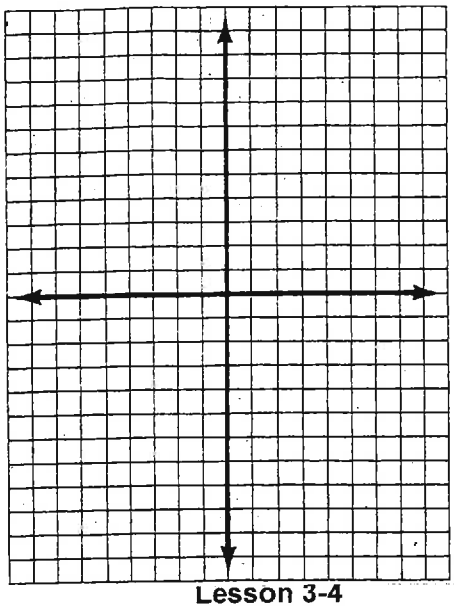
Let x=

Let y=

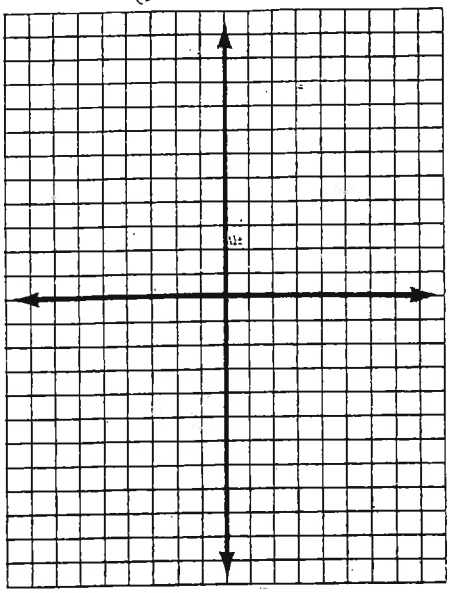
Lesson 3-3

Solve each system of inequalities by graphing.

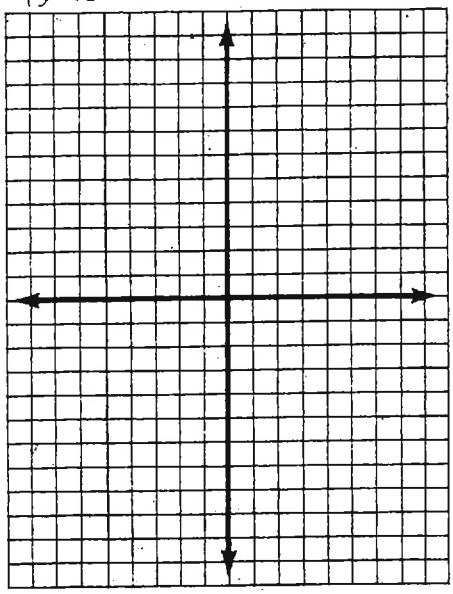
10. $\begin{cases} y \geq x - 3 \\ y \leq 3x + 7 \end{cases}$



11. $\begin{cases} 3x + 4y > 8 \\ y < 5x \end{cases}$



12. $\begin{cases} -x - 2y \geq -5 \\ y < 3 \end{cases}$



Lesson 3-4

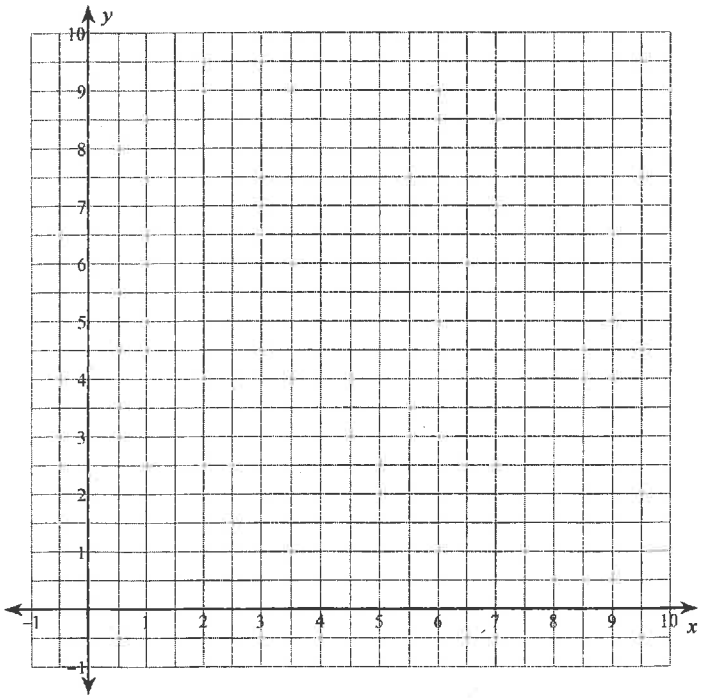
Find the values of x and y that maximize or minimize the objective function.

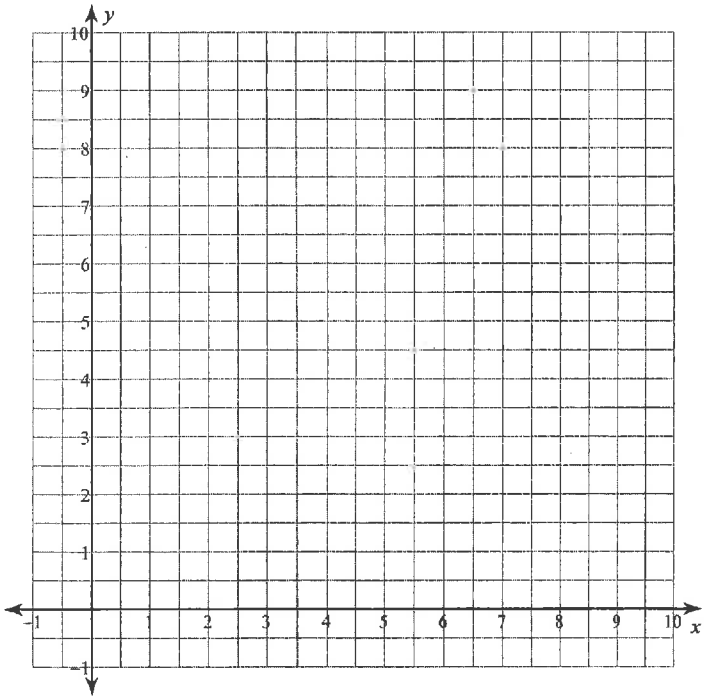
13. $\begin{cases} x \leq 4 \\ y \leq 3 \\ x \geq 0 \\ y \geq 0 \end{cases}$

maximum for
$P = 2x + y$

14. $\begin{cases} 1 \leq x \leq 6 \\ 2 \leq y \leq 4 \\ x + y \geq 4 \end{cases}$

maximum for
$P = 3x + 2y$



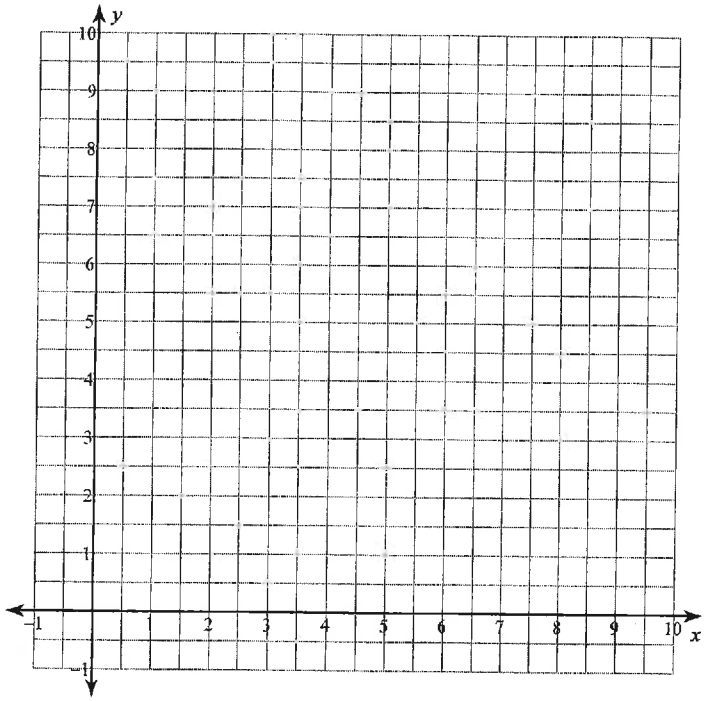


Write a linear program to solve.

15. A lunch stand makes \$.75 in profit on each chef's salad and \$1.20 in profit on each Caesar salad. On a typical weekday, it sells between 40 and 60 chef's salads and between 35 and 50 Caesar salads. The total number sold has never exceeded 100 salads. How many of each type of salad should be prepared to maximize profit?

Let x =
y =

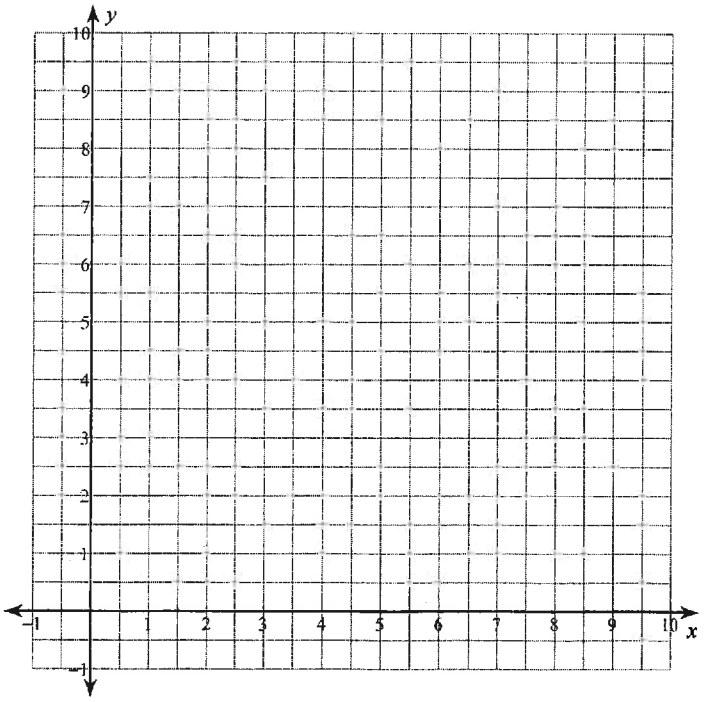
P =



16. A caterer must make at least 50 gal of potato soup and at least 120 gal of tomato soup. One chef can make 5 gal of potato soup and 6 gal of tomato soup in 1 h. Another chef can make 4 gal of potato soup and 12 gal of tomato soup in 1 h. The first chef earns \$20/h. The second chef earns \$22/h. How many hours should the company ask each chef to work to minimize the cost?

Let x =
y =

C =



Lesson 3-5

Solve each system of equations.

17. $\begin{cases} x+y+z=6 \\ x=2y \\ z=x+1 \end{cases}$

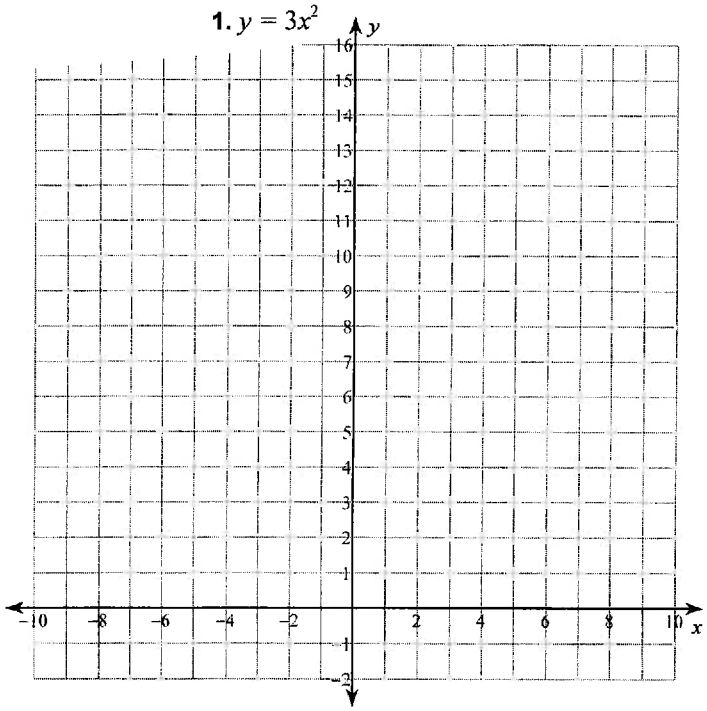
18. $\begin{cases} x-2y+z=8 \\ y-z=4 \\ z=3 \end{cases}$

Name_____ Class _____ Date Alg 2

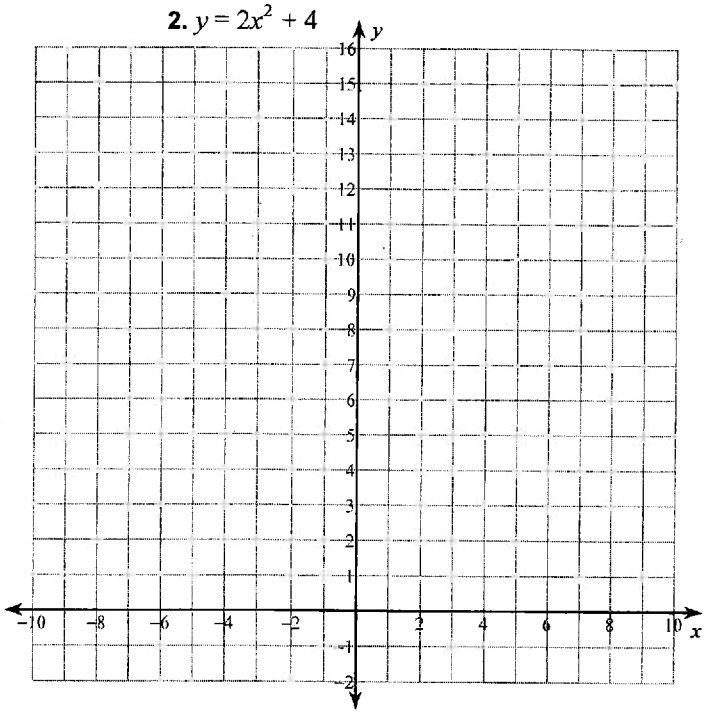
Lessons 4-1 and 4-2

Graph.

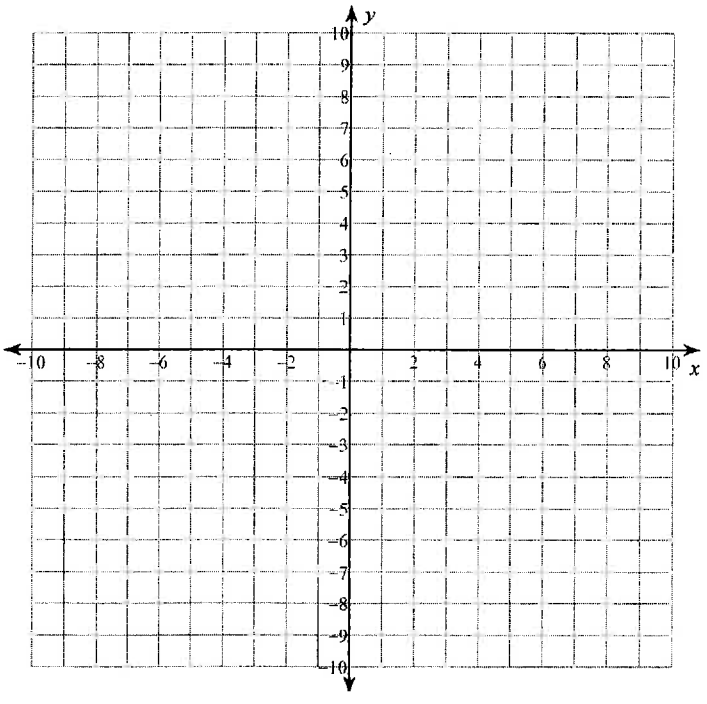
1. $y = 3x^2$



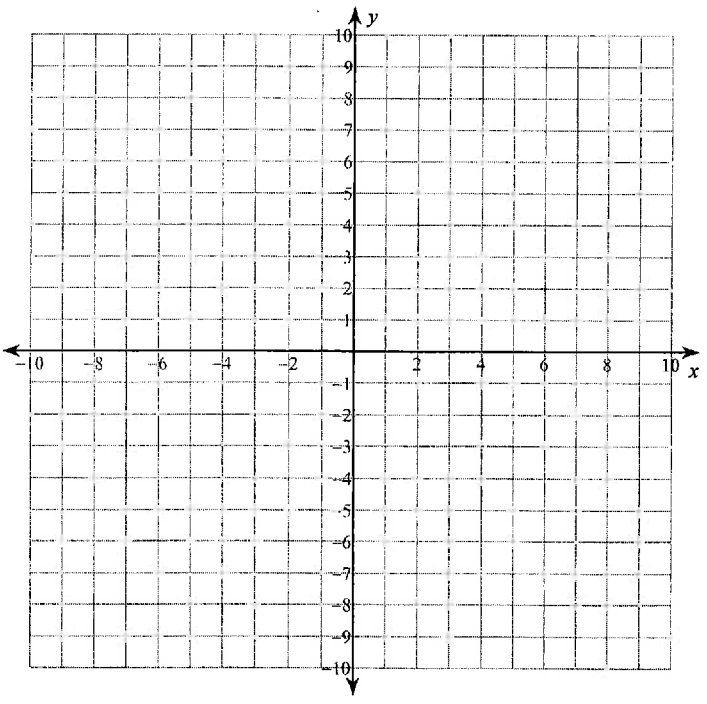
2. $y = 2x^2 + 4$



3. $y = (x + 1)^2 - 3$



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



Identify the vertex, axis of symmetry, minimum or maximum value, and domain and range of each function.

5. $f(x) = x^2 - 4x + 5$

6. $f(x) = -2x^2 + 4x - 3$

7. $y = x^2 + 5x - 14$

8. A ball is dropped from the top of a building. The distance in meters above the ground y of the ball after t seconds can be modeled by the equation $y = -9.8t^2 + 100$.

a. What is the y-intercept of the equation?

b. Describe the meaning of the y-intercept of the graph of the equation.

9. Marnie throws a softball straight up into the air. The ball leaves her hand when it is exactly 5 ft from the ground. The height h of the ball, in feet, can be written as a function of time t, in seconds, as $h = -16t^2 + 40t + 5$.

a. What is the maximum height the ball reaches?

b. Marnie catches the ball 5 ft from the ground. How long was the ball in the air?

Lesson 4-4

Factor each expression.

10. $x^2 + 3x - 54$

11. $x^2 + 10x + 24$

12. $x^2 - 36$

13. $x^2 - 9x - 36$

14. $x^2 - 15x + 56$

15. $25x^2 + 70x + 49$

16. $7x^2 - 20x - 3$

17. $5x^2 + 23x - 10$

18. $\frac{1}{4}x^2 - 4$

19. $x^2 - 6x - 16$

20. $4x^2 + 12x + 40$

21. $4x^2 - 6x + 9$

Lesson 4-5

Solve each equation by factoring or by taking square roots.

22. $x^2 + 4x - 1 = 0$ **23.** $4x^2 - 100 = 0$ **24.** $x^2 = -2x + 1$

25. $x^2 - 9 = 0$ **26.** $2x^2 + 4x = 70$ **27.** $x^2 - 30 = 10$

28. $x^2 + 4x = 0$ **29.** $x^2 + 3x + 2 = 0$ **30.** $x^2 = 8x = -16$

31. A toy rocket is fired upward from the ground. The relation between its height h, in feet, and the time t from launch, in seconds, can be described by the equation $h = -16t^2 + 64t$. How long does the rocket stay more than 48 feet above the ground?

Lessons 4-6 and 4-7

Solve each equation by completing the square or using the Quadratic Formula.

32. $x^2 + 5x + 8 = 4$ **33.** $2x^2 - 5x + 1 = 0$ **34.** $x^2 - 7x = 0$

35. $x^2 + 4x + 4 = 0$ **36.** $x^2 - 7 = 0$ **37.** $x^2 + 8x - 17 = 0$

Evaluate the discriminant of each equation. Tell how many real solutions each equation has.

38. $x^2 + 4x = 17$ **39.** $2x^2 + x = -1$ **40.** $x^2 - 4x + 5 = 0$

41. The height y of a parabolic arch is given by $y = -\frac{1}{16}x^2 + 40$, where x is the horizontal distance from the center of the base of the arch. All distances are in feet.

a. What is the highest point on the arch?

b. How wide is the arch at the base to the nearest tenth of a foot?

Lesson 4-8

Simplify each number by using the imaginary number *i*.

42. $\sqrt{-9}$ **43.** $\sqrt{-36}$ **44.** $\sqrt{-80}$

45. $\sqrt{-289}$ **46.** $\sqrt{-175}$ **47.** $\sqrt{-117}$

Simplify each expression.

48. $(3 - i) + (5 - 2i)$ **49.** $(4 + 2i)(1 - i)$ **50.** $(4 + 2i) - (3 + 5i)$

51. $(8 - 3i)(6 + 9i)$ **52.** $(2 + 5i) - (-6 + i)$ **53.** $(-2 - 3i)(7 - i)$

Solve each equation. Check your answers.

54. $x^2 + 16 = 0$ **55.** $3x^2 = x - 9$ **56.** $x^2 + 10 = 4x - 2$