

# Chapter 3 Chapter Test

Form G

## Do you know HOW?

Without graphing, classify each system as *independent*, *dependent*, or *inconsistent*.

1. 
$$\begin{cases} x - 5 = -y \\ 2y - 10 = -2x \end{cases}$$

$$\begin{aligned} -y &= x - 5 \\ -y &= x - 5 \\ y &= -x + 5 \end{aligned}$$

$$\begin{aligned} 2y - 10 &= -2x \\ +10 &+10 \\ 2y &= -2x + 10 \end{aligned}$$

$$y = -x + 5$$

*dependent*

2. 
$$\begin{cases} 2x = y - 7 \\ 4x - 2y + 4 = 0 \end{cases}$$

$$\begin{aligned} 2x &= y - 7 \\ +7 &+7 \\ 2x + 7 &= y \end{aligned}$$

$$\begin{aligned} 4x - 2y + 4 &= 0 \\ -4x &-4x \\ -2y + 4 &= -4x - 4 \\ -2y &= -4x - 4 \\ -2 &-2 \\ y &= 2x + 2 \end{aligned}$$

*inconsistent*

Solve each system by substitution or elimination.

3. 
$$\begin{cases} y = 2x + 8 \\ y = 3x - 1 \end{cases}$$

$$\begin{aligned} 3x - 1 &= 2x + 8 \\ -2x &-2x \\ x - 1 &= 8 \\ x &= 9 \end{aligned}$$

$$\begin{aligned} y &= 2(9) + 8 \\ y &= 18 + 8 \\ y &= 26 \end{aligned}$$

$(9, 26)$

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

$$\begin{aligned} (2x - y = 2) \times -1 \\ -2x + y &= -2 \\ 2x - 2y &= 4 \\ -2x + y &= -2 \\ -y &= 2 \\ y &= -2 \end{aligned}$$

$(0, -2)$

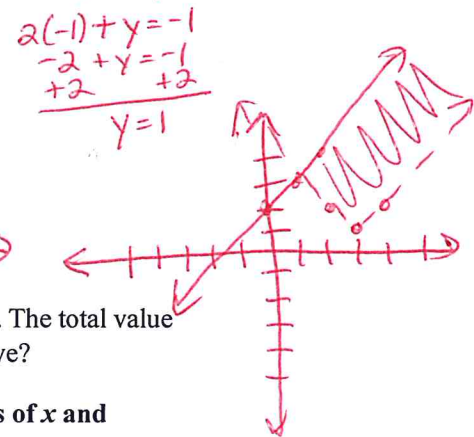
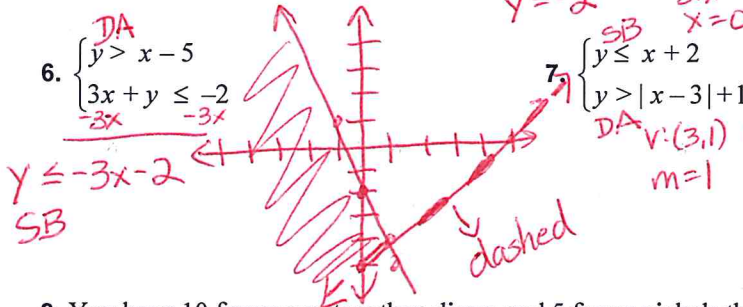
5. 
$$\begin{cases} -x + y = 2 \\ 2x + y = -1 \end{cases}$$

$$\begin{aligned} -x + y &= 2 \\ -1 &-1 \\ -2x + y &= 1 \\ -3x &= 3 \\ x &= -1 \end{aligned}$$

$$\begin{aligned} 2x + y &= -1 \\ 2 &+2 \\ 2x &= 1 \\ x &= 0.5 \end{aligned}$$

$(-1, 1)$

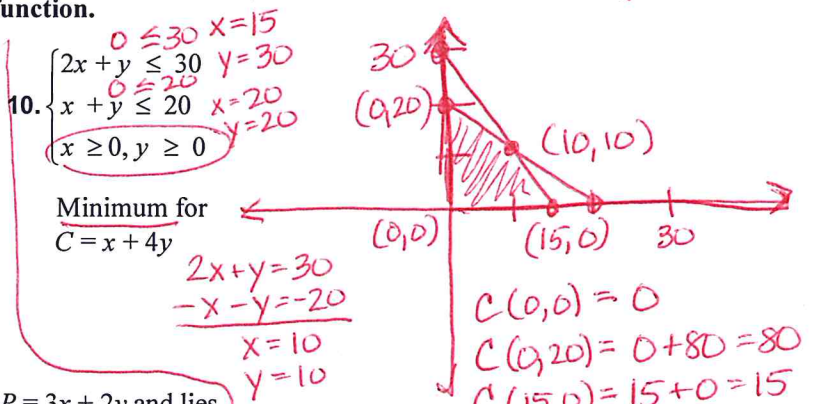
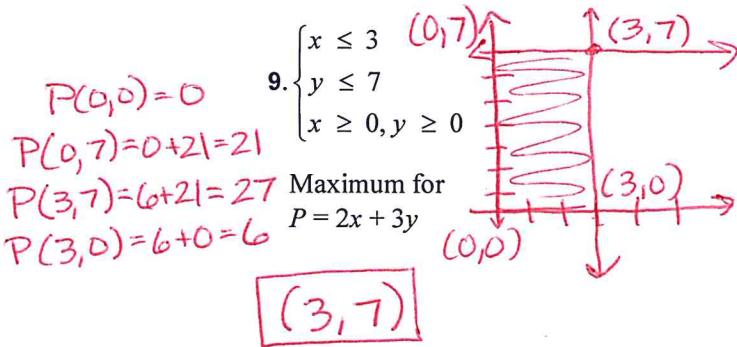
Graph the solutions of each system.



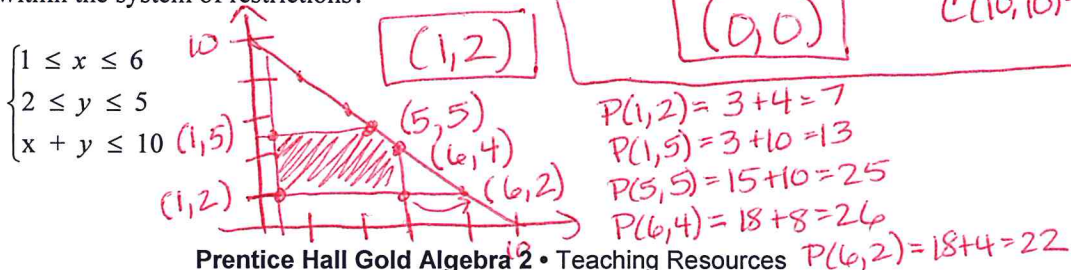
8. You have 10 fewer quarters than dimes and 5 fewer nickels than quarters. The total value of the coins is \$4.75. How many quarters, nickels, and dimes do you have?

*See next page*

Graph each system of constraints. Name all vertices. Then find the values of  $x$  and  $y$  that maximize or minimize the objective function.



11. Which point gives the minimum value for  $P = 3x + 2y$  and lies within the system of restrictions?



# Chapter 3 Chapter Test (continued)

Form G

12. What is the solution of the system represented by the matrix?

$$\begin{bmatrix} 2 & 4 & -3 & | & -3 \\ 1 & -2 & -7 & | & 5 \\ 3 & 5 & 0 & | & 3 \end{bmatrix}$$

②  $2x + 3y + 2z = -1$   
 3③  $3x - 3y + 3z = 6$

Solve each system of equations.

13.  $\begin{cases} 5x + 4y - z = 1 \\ 2x - 2y + z = 1 \\ -x - y + z = 2 \end{cases}$  (0, 1, 3)

14.  $\begin{cases} x + y + z = 0 \\ 2x + 3y + 2z = -1 \\ x - y + z = 2 \end{cases}$

15.  $\begin{cases} x + 2y = 0 \\ 4x - z = 4 \\ 5y + z = -1 \end{cases}$  →  $\begin{cases} x - 2 = 0, x = 2 \\ 4x + 5y = 3 \\ -4x - 8y = 0 \end{cases}$  →  $\begin{cases} -5 + z = -1 \\ +5 \quad +5 \\ z = 4 \end{cases}$  (2, -1, 4)

Do you UNDERSTAND?

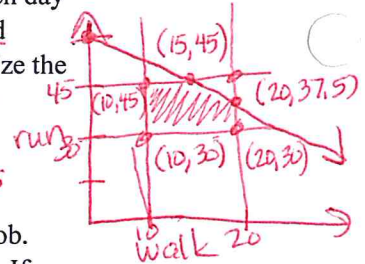
④  $\begin{cases} 2x + 2z = 2 \\ x + z = 1, y = -1 \end{cases}$

16. List three methods used to solve systems of equations. Describe the strengths of each method.

graphing  
 substitution  
 elimination

17. You burn 4 Cal/min walking and 10 Cal/min running. You walk 10 to 20 min each day and run 30 to 45 min each day. You never spend more than an hour running and walking together. How much time should you spend on each activity to maximize the number of Calories you burn? Will you have exercised enough to burn of a 500 Calorie meal?

$C = 4x + 10y$   
 $C(10, 45) = 40 + 450 = 490$   
 $C(10, 30) = 40 + 300 = 340$   
 $C(15, 45) = 60 + 450 = 510$   
 $C(20, 30) = 80 + 300 = 380$   
 $C(20, 37.5) = 80 + 375 = 455$



18. Plumber A charges \$25 for a house call and \$50 for each hour spent on the job. Plumber B charges \$35 for a house call and \$45 for each hour spent on the job. If your job will take 4 hours to complete, which plumber should you use? How much will it cost you?

$50h + 25 = 45h + 35$  ← after 2 hrs, n=2  
 $-45h \quad -45h$   
 $5h + 25 = 35 \rightarrow 5h = 10$   
 $-25 \quad -25$   
 $h = 2$

A:  $50(4) + 25 = 200 + 25 = \$225$   
 B:  $45(4) + 35 = 180 + 35 = 215$

19. Open Ended Write a system of inequalities that has infinite solutions.

$x + y \geq 3$   
 $2x + y < 4$

20. Error Analysis A student says that the system of equations is represented by the matrix. What error did the student make? What is the correct matrix?

$$\begin{cases} 5x - 2y + 2z = 7 \\ 3x + 4y = 11 \\ 2x - 6y + 5z = 5 \end{cases}$$

$$\begin{bmatrix} 5 & -2 & 2 & | & 7 \\ 3 & 4 & 1 & | & 11 \\ 2 & -6 & 5 & | & 5 \end{bmatrix}$$

should be 0

8.  $q = d - 10 \rightarrow d = q + 10$  sub.  
 $n = q - 5$  sub.  $n = 10 - 5 = 5$   
 $25q + 10d + 5n = 475$

~~$25(q+10) + 5(q-5) = 475$~~   
 $25q + 10(q+10) + 5(q-5) = 475$   
 $25q + 10q + 100 + 5q - 25 = 475$   
 $40q + 75 = 475$   
 $-75 \quad -75$   
 $40q = 400$   
 $q = 10$   
 $d = 10 + 10 = 20$   
 $n = 10 - 5 = 5$

10 quarters  
 20 dimes  
 5 nickels