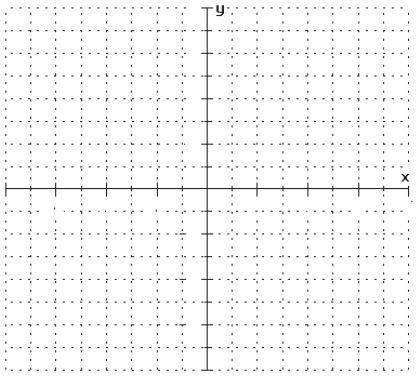
Name: **Date:**
Instructor: **Section:**

Chapter 4 Test Form A

Solve each system of equations by graphing.

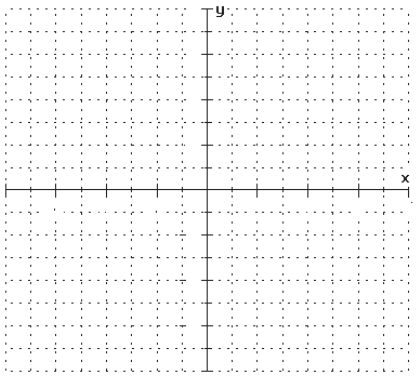
1. $\begin{cases} 2x - 2y = -4 \\ x + y = 6 \end{cases}$

1. _____



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

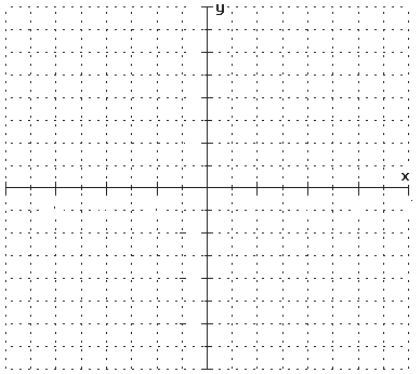
2. _____



Name: **Date:**
Instructor: **Section:**

Chapter 4 Test Form A *cont'd*

3. $\begin{cases} x-2y=4 \\ -2x+4y=6 \end{cases}$ **3.** _____



4. Solve the system of equations by using substitution. **4.** _____

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

5. Solve the system of equations by using elimination. **5.** _____

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

Solve each system by using the substitution or elimination method.

6. $\begin{cases} -x+y=-9 \\ x-2y=13 \end{cases}$ **6.** _____

7. $\begin{cases} 7x-6y=-5 \\ 4x+4y=12 \end{cases}$ **7.** _____

8. $\begin{cases} 2x+y=6 \\ -x-\frac{1}{2}y=-3 \end{cases}$ **8.** _____

9. $\begin{cases} 4x+3y=\frac{3}{2} \\ 3x-2y=-\frac{19}{2} \end{cases}$ **9.** _____

Name: **Date:**
Instructor: **Section:**

Chapter 4 Test Form A *cont'd*

10. $\begin{cases} 2x+4y=16 \\ 3x+6y=12 \end{cases}$ **10.** _____

11. $\begin{cases} 2y=x-2 \\ 3x-6y=6 \end{cases}$ **11.** _____

12. $\begin{cases} 3x-6y=5 \\ x+4y=3 \end{cases}$ **12.** _____

13. A plane traveled a distance of 1800 miles in 3 hours. Find its average speed, rounded to the nearest mile per hour.

14. One number is 3 more than a second number. Twice the first is 9 less than 3 times the second. Find the numbers.

15. A plane traveled a distance of 2400 miles in 4 hours with the wind. The return trip takes 5 hours against the wind. Find the speed of the plane in still air and the speed of the wind.

16. Two cars leave from a town at the same time traveling in opposite directions. One travels 5 mph faster than the other. In 3 hours, they are 267 miles apart. Find how fast each is traveling.

17. Carol has available a 20% alcohol solution and a 65% alcohol solution. Find how many liters of each solution she should mix to make 25 liters of 38% alcohol solution.

18. In a discount clothing store, all sweaters are sold at one fixed price and all shirts are sold at another fixed price. If one sweater and three shirts cost $42, while three sweaters and two shirts costs $56, find the price of one sweater and the price of one shirt.

19. Given the cost function C(x) = 2700 + 31x and the revenue function R(x) = 49x , find the number of units, x, that must be sold to break even.

20. Baskets, Inc., is planning to introduce a new woven basket. The company estimates that $500 worth of new equipment will be needed to to manufacture this new type of basket and that it will cost $15 per basket to manufacture. The company also estimates that the revenue from each basket will be $31.

a.) Determine the revenue function R(x) from the sale of x baskets.

b.) Determine the cost function C(x) for manufacturing x baskets.

c.) Determine the profit function, P(x), from the sale of x baskets.

d.) Find the break-even point. Round to the nearest whole basket.

Name: **Date:**
Instructor: **Section:**

Chapter 4 Test Form A *cont'd*

21. $\begin{cases} 2x + y + z = -1 \\ 3x - y + 2z = -4 \\ x - 2y - 3z = -3 \end{cases}$

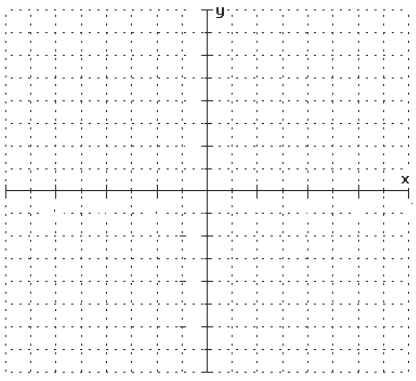
20. _____

22. $\begin{cases} 3x + 4y - z = 3 \\ x + 2y + 3z = 7 \\ x - y - 2z = 0 \end{cases}$

21. _____

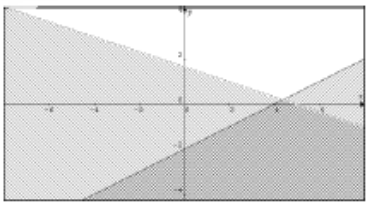
23. Graph the solution to the system of linear inequalities.

$$\begin{cases} x - 2y \geq 4 \\ x + 3y < 5 \end{cases}$$



Test 4 – A

1. $(2, 4)$
2. $(-1, 0)$
3. Ø
4. $(-3, 1)$
5. $(-1, 1)$
6. $(5, -4)$
7. $(1, 2)$
8. $\{(x, y) \mid 2x + y = 6\}$
9. $\left(-\frac{3}{2}, \frac{5}{2}\right)$
10. Ø
11. $\{(x,y) \mid x - 2y = 3\}$
12. $\left(\frac{19}{9}, \frac{2}{9}\right)$
13. 600 mph
14. (18 liters, 15 liters)
15. (540 mph, 60 mph)
16. (47 mph, 42 mph)
17. (15 liters, 10 liters)
18. (12, 10)
19. 150 units
20.
a.) R(x) = 31x
b.) C(x) = 15x + 500
c.) P(x) = 16x - 500
d.) x = 32 baskets
21. (-1,1,0)
22. (3, -1, 2)
23.



Check your Solutions!

(13) $d = r \cdot t$

$1800 = r \cdot 3 \Rightarrow r = \frac{1800 \text{ mi}}{3 \text{ hr}} = 600 \text{ mi/hr}$

(14) $\begin{cases} x = 3 + y \\ 2x = 3y - 9 \end{cases}$ Subst: replace the x in eqn ② with $3+y$

$2(3+y) = 3y - 9$

$6 + 2y = 3y - 9$

$-6 \quad -3y \quad -3y - 6$

$-y = -15 \Rightarrow [y = 15] \Rightarrow [x = 3 + 15 = 18]$

$(x, y) = (18, 15)$

(15) Let y = the average speed of the wind and let x = the average speed of the plane. There were two parts of the trip: one part with the wind and a return flight traveling against the wind. The distance, 2400 miles, is the same for both parts of the round trip.

	Rate	$\times$ time	$=$ distance
trip with the wind	$x+y$	4	$4(x+y)$
trip against the wind	$x-y$	5	$5(x-y)$

$\begin{cases} 4(x+y) = 2400 \\ 5(x-y) = 2400 \end{cases} = \begin{cases} 4x+4y = 2400 \\ 5x-5x = 2400 \end{cases}$ ← we can use the elimination method. ← multiply by 5 ← multiply by 4

$= \begin{cases} 20x + 20y = 9600 \\ 20x - 20y = 12000 \end{cases}$ eliminate y by adding the equations, then solve for x

$20x + 20y = 9600$

$+ 20x - 20y = 12000$

$40x + 0 = 21600$

(15) (continued)

$40x = 21600$

$\frac{40x}{40} = \frac{21600}{40}$

$x = 540$ mph

$$\begin{array}{r} 540 \text{ mph} \\ 4\overline{)2160} \\ -20\downarrow \\ \hline 16 \\ -16 \\ \hline 00 \\ -0 \\ \hline 0 \end{array}$$

$x = 540$ mph

Solve for y now with either of the original 2 eqns.

(eqn 2) $5x - 5y = 2400$ (divide by 5)

$x - y = 480$

$540 - y = 480$

$-540 \quad -540$

$-y = -60$

$y = 60$ mph

(16)

	rate	x	time,	=	distance
car 1	x		3		$3x$
car 2	y		3		$3y$

We let x and y represent the speeds of each car, respectively. We can derive expressions for the distance traveled by each car.

(The distance traveled by car 1 in 3 hrs) + (The distance traveled by car 2 in 3 hrs) = 267 miles

(The speed of car 1) = (5 mph) + (The speed of car 2)

We are told this. This suggests these 2 eqns are related.

$$\begin{cases} 3x + 3y = 267 \\ x = 5 + y \end{cases}$$

We can use substitution.

$3x + 3y = 267$ (eqn 1)

$3(5+y) + 3y = 267$

$15 + 3y + 3y = 267$

$15 + 6y = 267$

$-15 \quad -15$

$6y = 252$

$y = \frac{252}{6} = 42$ mph

So $y = 42$ mph and $x = 47$ mph

(17) Let x = the amount of liters of 20% alcohol soln.

and let y = " " " " " 65% " "

We need a 25 liter mixture, so $x+y=25$ is one eqn. The amount of pure alcohol in the mixture is 38% of 25 liters, or $(0.38)(25\ \ell) = 9.5$ liters.

The amount of pure alcohol in the 20% solution	+	The amount of pure alcohol in the 65% solution	=	The amount of pure alcohol in the 38% solution

$$0.20x + 0.65y = (0.38)(65)$$

Thus, the system is $\begin{cases} x+y=25 \\ 0.2x+0.65y=9.5 \end{cases}$.

We can use the substitution method. Subtract x from eqn 1 and multiply eqn 2 by 100 to clear it of decimals.

$$\begin{cases} y = 25-x \\ 20x+65y=950 \end{cases}$$

(Continued from below left)

$20x+65y=950$

$20x+65(25-x)=950$

$20x+1625-65x=950$

$-45x+1625=950$

$-45x = 950-1625$

$-45x = -675$

$\frac{-45x}{-45} = \frac{-675}{-45}$

$x = 15$ liters

and

$y = 25-x$

$= 25-15 = 10$ liters

$(x,y) = (15,10)$

(18) Let x = the price of a sweater & y = the price of a shirt.

Then, $\begin{cases} 1x + 3y = 42 \\ 3x + 2y = 56 \end{cases}$ ← eliminate x. multiply this eqn by -3 then add the result to eqn 2.

$$\begin{array}{r} -3x - 9y = -126 \\ +\ 3x + 2y = 56 \\ \hline -7y = -70 \end{array}$$

then, $\frac{-7y}{-7} = \frac{-70}{-7}$

or $\boxed{y = 10}$

eqn 1

$1x + 3(10) = 42$

$x + 30 = 42$

$\boxed{x = 42 - 30 = 12}$

---

(19) $2700 + 31x = 49x$

$2700 = 49x - 31x$

$2700 = 18x$

$18x = 2700$

$\frac{18x}{18} = \frac{2700}{18}$

$\boxed{x = 150 \text{ units}}$

---

(20) Let x represent the number of baskets sold.

(a) revenue = (price) x (quantity sold) or $\boxed{R(x) = \$31x}$.

(b) costs = \$15 per basket + \$500 in equipment or $\boxed{C(x) = \$15x + \$500}$

(c) profit = revenue minus costs or $P(x) = R(x) - C(x)$

$= 31x - (15x + 500)$

$= 31x - 15x - 500 = 16x - 500$

$\boxed{P(x) = 16x - 500}$

(d) Breakeven point when profit is zero, or when revenue equals cost.

$P(x) = 16x - 500$

$0 = 16x - 500$

$500 = 16x$

$\frac{500}{16} = \frac{16x}{16}$

$x = \frac{500}{16} = 31.25$

The company will start profiting after they sell 32 baskets.